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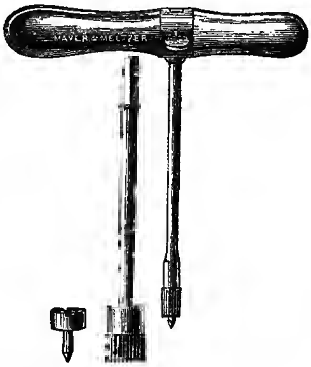

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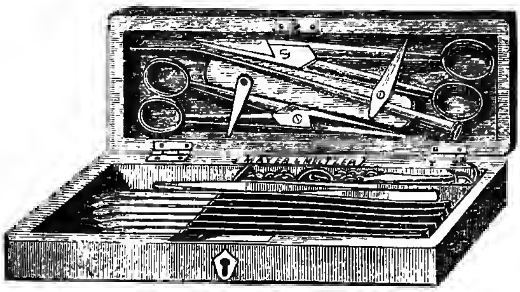

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PREFACE

In this, the last part of these plates, the objects stated in the previous parts have been steadily kept in view, and although, perhaps, they may not equal those of Part III., yet it is hoped that they may be of use in delineating the main facts connected with the anatomy of the abdomen. Two or three dissections of the abdomen from the back were tried, but owing to the extreme age of most of the subjects, they did not yield satisfactory results, and so this view was necessarily omitted.

Two of the plates—viz. those of the anterior view of the abdomen—had to be drawn double, because it was found that in order to get them satisfactorily on a single plate it would have been necessary to reduce them to half natural size.

I am much indebted to my friend Mr. R. T. Kent; F.R.C.S., the Dean of the St. Mungo School of Medicine at Glasgow, for his kindness in placing at my disposal the necessary material for the dissection of the last plate.

I am also indebted to Professor Cunningham for permission to introduce his diagrams of the sections of the body in the mid-Poupart planes, and to Dr. Rolleston for permission to introduce the drawings of the supra-renal bodies made by him to illustrate his paper on their anatomy.

I again wish to thank Mr. Highley for the care which he has bestowed upon the plates and diagrams ; Mr. A. G. Noble for giving great assistance in the dissection of some of the plates ; and Dr. Guthrie for his kindness in reading over and criticising the proof sheets.

C. Gordon Brodie.

30 Harley Street, Cavendish Square, W.
March, 1895.

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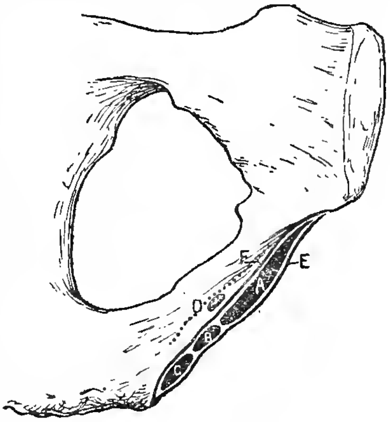
PLATE LVIII.

THE ISCHIO-RECTAL FOSSA, AND SUPERFICIAL VIEW OF THE PERINEUM.

In this dissection the skin and superficial fascia have been removed, and the fossa emptied of its fat. On the right side, the fasciæ bounding it deeply have been left intact; while on the left side the anal fascia has been removed to expose the levator ani, and the obturator fascia cut into to show Alcock's canal, which contains the internal pudic vessels and nerve.

The deep layer of the superficial perineal fascia (Colles's fascia) has been left to show how it covers the superficial perineal muscles, turning round the transversus perinei to form the anterior boundary of the ischio-rectal fossa, and to join the anterior layer of the triangular ligament. Laterally it is attached to the lower border of the pubic and ischial rami as far as the tuber, and in front passes into the dartoid tissue of the scrotum, becoming continuous with the fascia of Scarpa. In the middle line a vertical septum descends to the bulb, completely dividing the space into two behind, but incomplete in front: hence in rupture of the urethra the urine must pass forwards towards the scrotum in order to gain the opposite side; it cannot pass back into the ischio-rectal fossa because the fascia of Colles joins the anterior layer of the triangular ligament. If the internal surface of the rami of the ischium and pubes be examined, it will be seen that the inner edge of their lower border turns somewhat inward, forming the inner margin of the tuber ischii; this is joined by another faint line which runs along the inner surface of the bone from the bottom of the symphysis pubis. The fascia of Colles (E) is attached to the former, while the latter receives the attachment of the anterior layer of the triangular ligament (F), the space between giving attachment to the crus (A), erector penis (B), and transversus perinei (C).



Inner View of Pubes and Ischium.

A, Crus penis; B, Erector penis; C, Transversus perinei; D, Compressor urethræ; E, Fascia of Colles; F, Anterior layer of triangular ligament. The dotted line shows about the position of the posterior layer of the triangular ligament.

The *ischio-rectal* fossa is bounded:—

In front.—By Colles's fascia turning over the transversus perinei to join the anterior layer of the triangular ligament.

Behind.—By the tip of the coccyx.

Externally.—By the tuber ischii and obturator fascia covering the obturator internus, edge of gluteus maximus, and great sacro-sciatic ligament.

Internally.—By the anal fascia covering the levator ani, and the external sphincter.

Contents.—Inferior hæmorrhoidal vessels and nerve which cross the space, superficial perineal vessels and nerve, the perineal branch of the fourth sacral, and the padding of fat.

The internal pudic vessels and nerve can be felt in the outer wall of the fossa running in the obturator fascia.

PLATE LVIII.

MUSCLES AND FASCIÆ

A Placed on the tuber ischii.
B Tip of the coccyx.
C Skin round the anus.
D Placed on Colles's fascia as it begins to turn round the transversus perinei.
E Obturator fascia covering obturator internus.
F Anal fascia covering levator ani.
G Edge of gluteus maximus.
H External sphincter muscle.
K Levator ani muscle.
L Alcock's canal.
M Placed on Colles's fascia over erector penis.
N Placed over the prominence of the bulb.

VESSELS

a Internal pudic artery in Alcock's canal; on the opposite side it is seen just showing through the fascia.
b Inferior hæmorrhoidal branches.
c Cutaneous twigs from hæmorrhoidal to skin and fat over fossa.
d Superficial perineal artery.

NERVES

1 Internal pudic nerve.
2 Inferior hæmorrhoidal branches.
3 Cutaneous twigs of hæmorrhoidal.
4 Perineal branch of fourth sacral supplying external sphincter.
5 Perforating cutaneous nerve from the anterior primary branches of 3rd and 4th or 4th sacral.
6 Twigs from the posterior primary branches of the sacral nerves.

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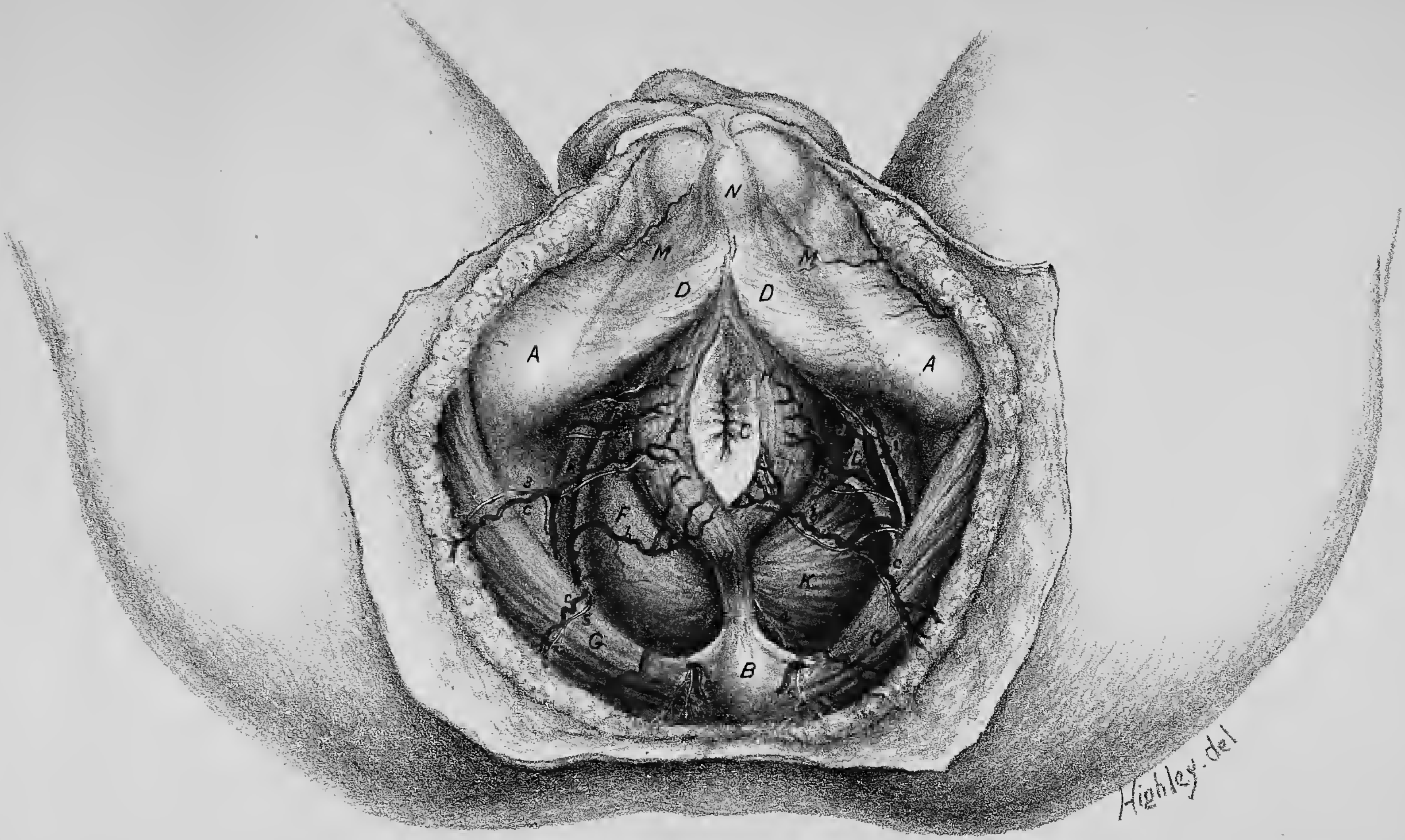

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PLATE LIX.

THE SECOND VIEW OF THE PERINEUM.

In this dissection the deep layer of the superficial fascia (Colles's) has been removed to expose the structures lying between it and the anterior layer of the triangular ligament, while on the left side the crus and erector penis muscles have been cut through to expose completely the anterior layer of the ligament.

Between the fascia of Colles and the anterior layer of the triangular ligament the following structures are contained: the transversus perinei muscles behind; the crura and erector muscles along the rami; in the middle line the accelerator urinæ covering the bulbous portion of the corpus spongiosum; and the superficial perineal vessels and nerves.

The central fixed point of the perineum is situated about an inch in front of the anus, and is the meeting-place of the following structures: the transversus perinei, levator ani, accelerator urinæ, and sphincter ani muscles; the latter is the most superficial, and is attached about this point to the fascia of Colles and the subcutaneous tissue. This central point is important clinically, for a knife sunk in the centre line and carried a little backwards and upwards would open up the membranous urethra, and it is just behind this point that the knife is entered in perineal lithotomy.

The levator ani was primarily a depressor of the tail, but atrophy of that organ and the enlargement of the pelvic outlet have modified the muscle. Its hinder part, attached to the coccyx, is the coccygeus muscle, while the rest forms a diaphragm for the pelvic outlet. The superficial sphincter is also a subcaudal slip segmented from the levator (Macalister).

PLATE LIX.

MUSCLES AND FASCIÆ

A External sphincter.
B Levator ani.
C Crus penis (corpus cavernosum).
D The section of the left crus, at its origin from the ramus.
E Erector penis.
F Accelerator urinæ covering the bulb.
G Slips from the accelerator, which pass over crura and, expanding into an aponeurosis, meet on the dorsum of the penis over the dorsal vein.
H Corpus spongiosum.
I Fascia of Colles.
K Transversus perinei.
L Anterior layer of the triangular ligament.
M The skin around anus.
N Placed on the anterior portion of the tuber ischii.
O Fascia lata covering the adductor muscles.
P Gluteus maximus.
R Tip of coccyx.

VESSELS

a Inferior hæmorrhoidal branches of the internal pudic.
b Superficial perineal branches of the internal pudic.
c Transverse perineal artery.

NERVES

1 Inferior hæmorrhoidal.
2 Superficial perineal.
3 Muscular branch to the erector penis.
4 Muscular branch from superficial perineal to levator ani.
5 Muscular branches to accelerator urinæ and bulb.
6 Inferior pudendal from small sciatic.
7 Perineal branch of the fourth sacral.

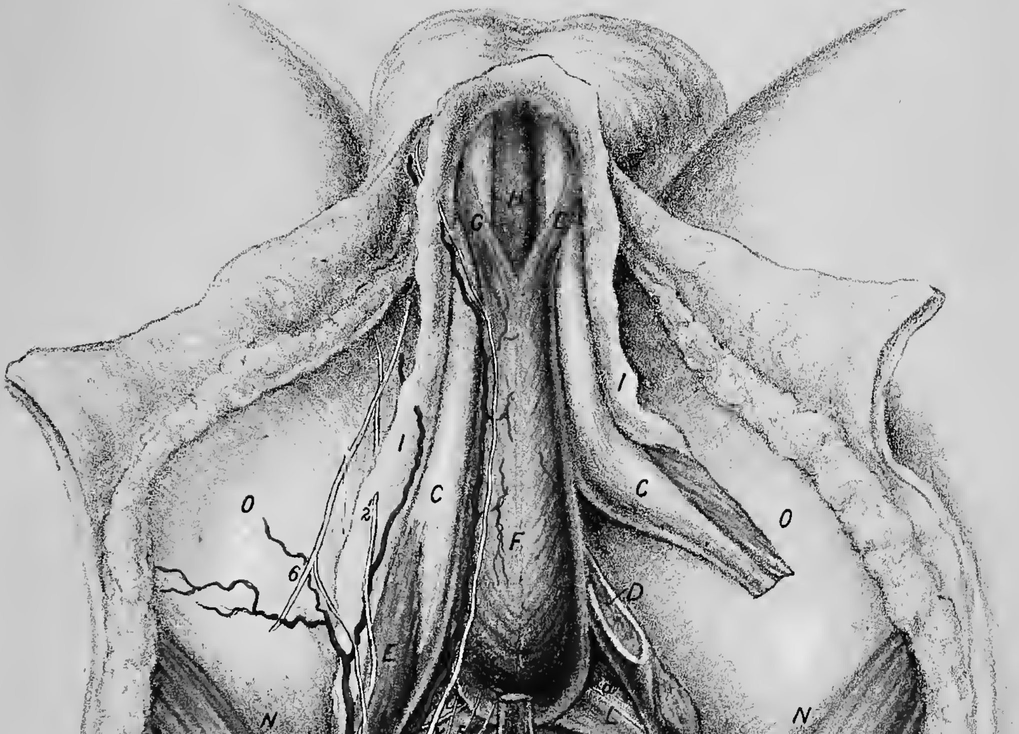
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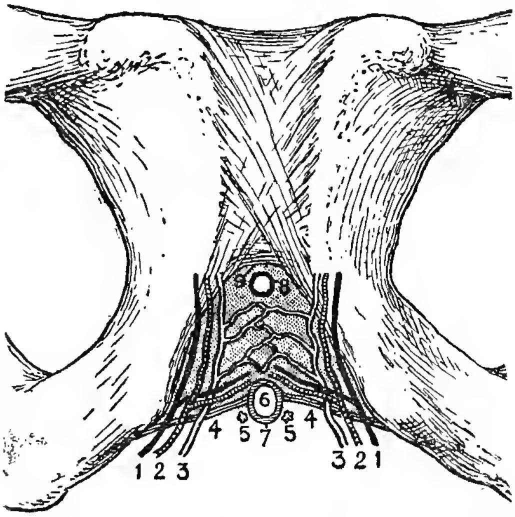
PLATE LX.

THE THIRD VIEW OF THE PERINEUM—PROSTATE AND VESICULÆ SEMINALES.

In this view of the perineum the accelerator urinæ has been divided along its central raphi and turned aside to expose the bulbous portion of the corpus spongiosum. The levator ani has been severed behind the central fixed point of the perineum, and the rectum pulled back to expose the prostate and base of bladder, with the vesiculæ seminales. The anterior layer of the triangular ligament was removed on the left side, to show the internal pudic artery and dorsal nerve of the penis.



The following structures are contained between the two layers of the triangular ligament :—

1. Dorsal nerve of penis, and twig to the bulb.
2. Internal pudic arteries, and arteries to the bulb.
3. Plexus of veins.
4. Deep transverse muscle.
5. Cowper's glands.
6. Membranous urethra.
7. Compressor urethræ.
8. Dorsal vein of penis.
9. Subpubic ligament.

Thus, in the dissection of the perineum the following alternating layers have been seen and divided :—

1. **Fascia of Colles**, or deep layer of the superficial fascia.
2. Superficial perineal muscles
    - Erector penis.
    - Accelerator urinæ.
    - Transversus perinei.
3. **Anterior layer of triangular ligament.**
4. Compressor urethræ and deep transversus muscle.
5. **Posterior layer of the triangular ligament.**
6. Levator ani.
7. **Capsule of prostate.**

PLATE LX.

MUSCLES, &c.

A Gluteus maximus.
B External sphincter turned back.
C Rectum.
D Levator ani (the letter points to its cut edge).
E Obturator fascia.
F Recto-vesical fascia, which has been cut and turned back with the rectum.
G Prostate gland.
H Vesiculæ seminales.
I Vasa deferentia.
K Membranous portion of urethra.
L Anterior layer of the triangular ligament.
M Bulbous portion of the corpus spongiosum.
N Accelerator urinæ.
N′ The band of the accelerator which passes over the crus to be inserted into its fellow of the opposite side.
O Corpora cavernosa (crura of the penis).
P Origin of the crus penis from rami of the ischium to pubis.
R Erector penis.
S Deep transverse muscle running into
T Compressor urethræ.
V Fascia of Colles (deep layer of the superficial fascia).

VESSELS

a Internal pudic artery.
b Artery to the bulb.
c A twig from the inferior vesical.

NERVE

1 Dorsal nerve of the penis.

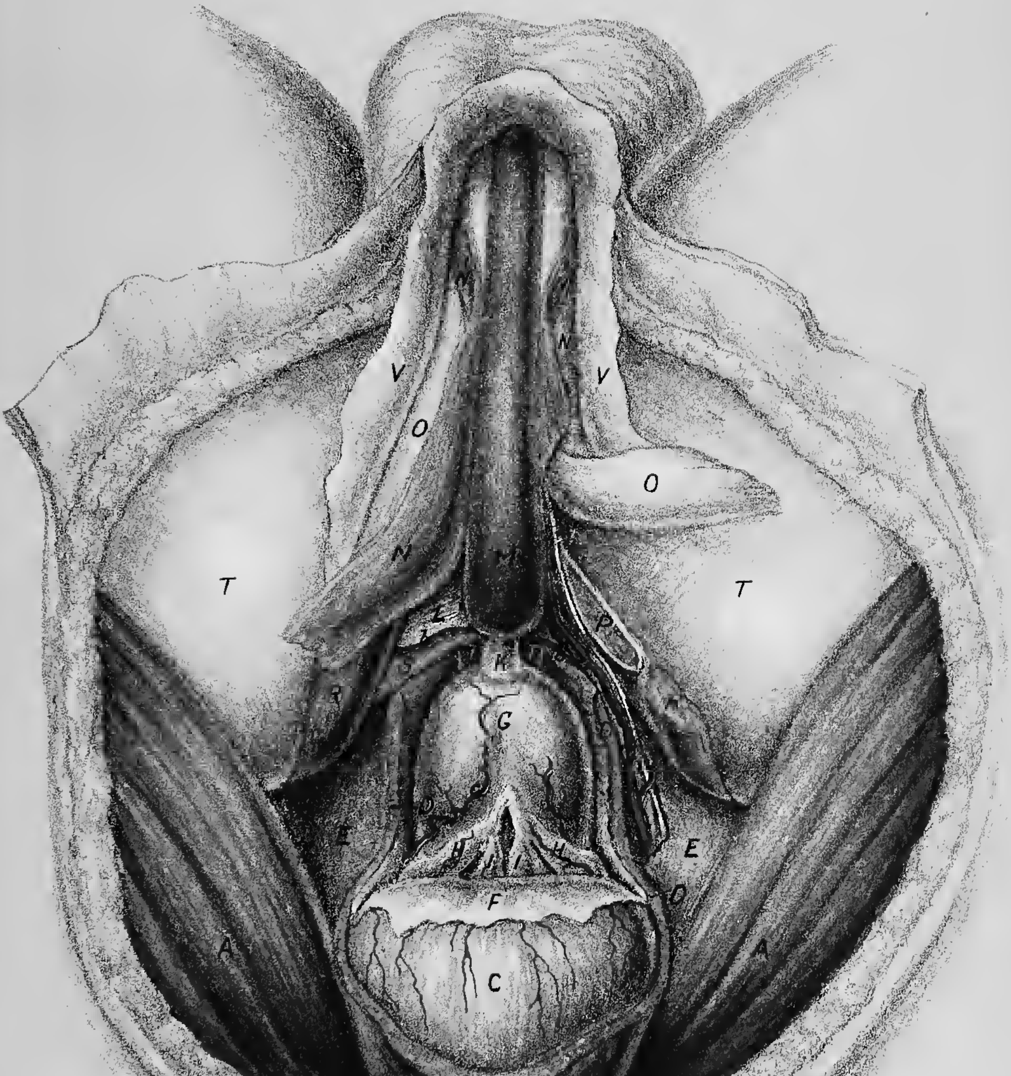

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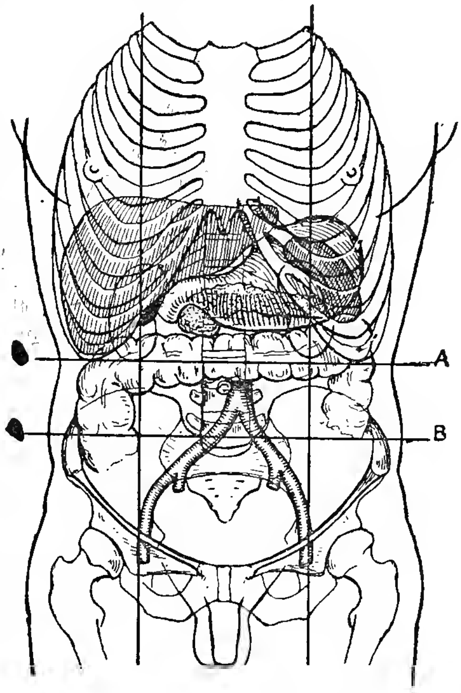
PLATE LXI.–LXII.

SUPERFICIAL VIEW OF THE FRONT OF THE ABDOMEN.

This plate shows a dissection of the front of the abdomen : the left side after removal of the subcutaneous tissue; and the right with the external oblique divided longitudinally near the junction of muscle and aponeurosis, and the ends reflected to show the internal oblique. It also shows well the way in which the external oblique muscle arises from the ribs by means of serrations. The deep layer of the superficial fascia is thin and membranous, requiring great care in dissection to preserve it. It is called the fascia of Scarpa, and unlike the superficial layer, which is continuous with that of the limbs, it is bound down to the fascia lata along the line of Poupart's ligament, passing centrally into the dartoid tissue of the scrotum, becoming inseparable from it, and thence is continued into the deep layer of the superficial perineal fascia. Thus extravasation of urine can pass freely from the perineum into the scrotum and on to the abdomen, but is prevented from creeping down the legs.



The external abdominal ring is a triangular interval left between the fibres of the aponeurosis of the external oblique. The upper edge or pillar is sharp, and passes to its insertion in front of the body of the pubes; while the lower edge or pillar is rounded (it is the inner end of Poupart's ligament), and is attached to the spine of the pubes. The base of the triangle is formed by the outer part of the pubic crest. Through the ring issues the cord in the male, and the round ligament in the female.

The two pillars are bound together by the intercolumnar fascia, which also forms a covering to the cord and testis under the name of the external spermatic fascia.

Note.—In this diagram the artist has carried the outline of the splenic flexure too much to the left. On reference to the section given on page 126, it will be seen that the summit of the splenic flexure has been cut by the mid-Poupart perpendicular line.

PLATE LXI.–LXII.

MUSCLES, &c.

A Left external oblique.
A′ Right external oblique reflected and showing origin from the ribs.
B Aponeurosis of left external oblique.
C Intercolumnar fibres.
D Prolongation of the intercolumnar fibres or fascia upon the cord, and here called the external spermatic fascia.
E Placed over the spine of the pubes.
F The upper pillar of the external abdominal ring.
G Poupart's ligament.
H Internal oblique.
I Cremasteric muscular fibres.
K Digitations of the serratus magnus.
L Aponeurosis of the right external oblique, cut.
M Anterior lamella of the aponeurosis of the internal oblique.
N Linea semilunaris, which corresponds to the edge of the rectus.
O Lineæ transversæ.
P Linea alba.
R The ribs. They are numbered according to their position.
S Suspensory ligament of the penis.
T Corpora cavernosa.

VESSEL

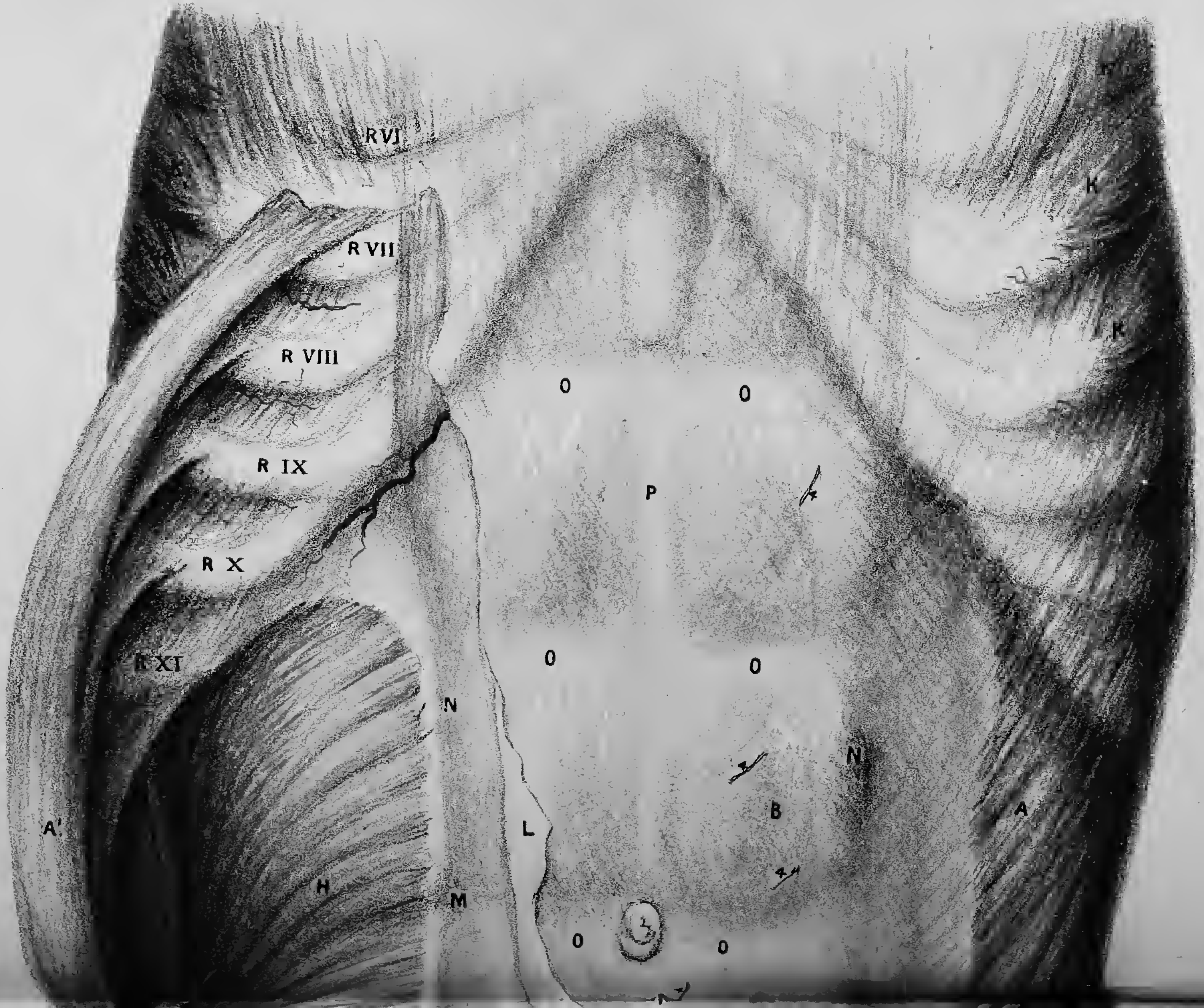
a Cremasteric artery from the deep epigastric.

NERVES

1 Ilio-inguinal from the first lumbar.
2 Ilio-hypogastric from the first lumbar.
3 Muscular branch to the external oblique.
4 Anterior branches from the lower dorsal nerves.

The rectus is a metamerised vertical muscle whose several bellies retain their separate innervation (Macalister), the bellies being divided off by the lineæ transversæ, which are attached to the anterior sheath of the muscle, and penetrate more or less completely through, but are not attached to the posterior sheath. Each belly has its separate nerve-supply, the highest from the seventh and eighth intercostals, the next from the ninth, the next from the tenth and eleventh, and the lowest from the twelfth, which also supplies the pyramidalis.

In the Koala (a marsupial) the internal oblique has four or five well-marked fibrous septa in direct serial continuity with the ribs (Young).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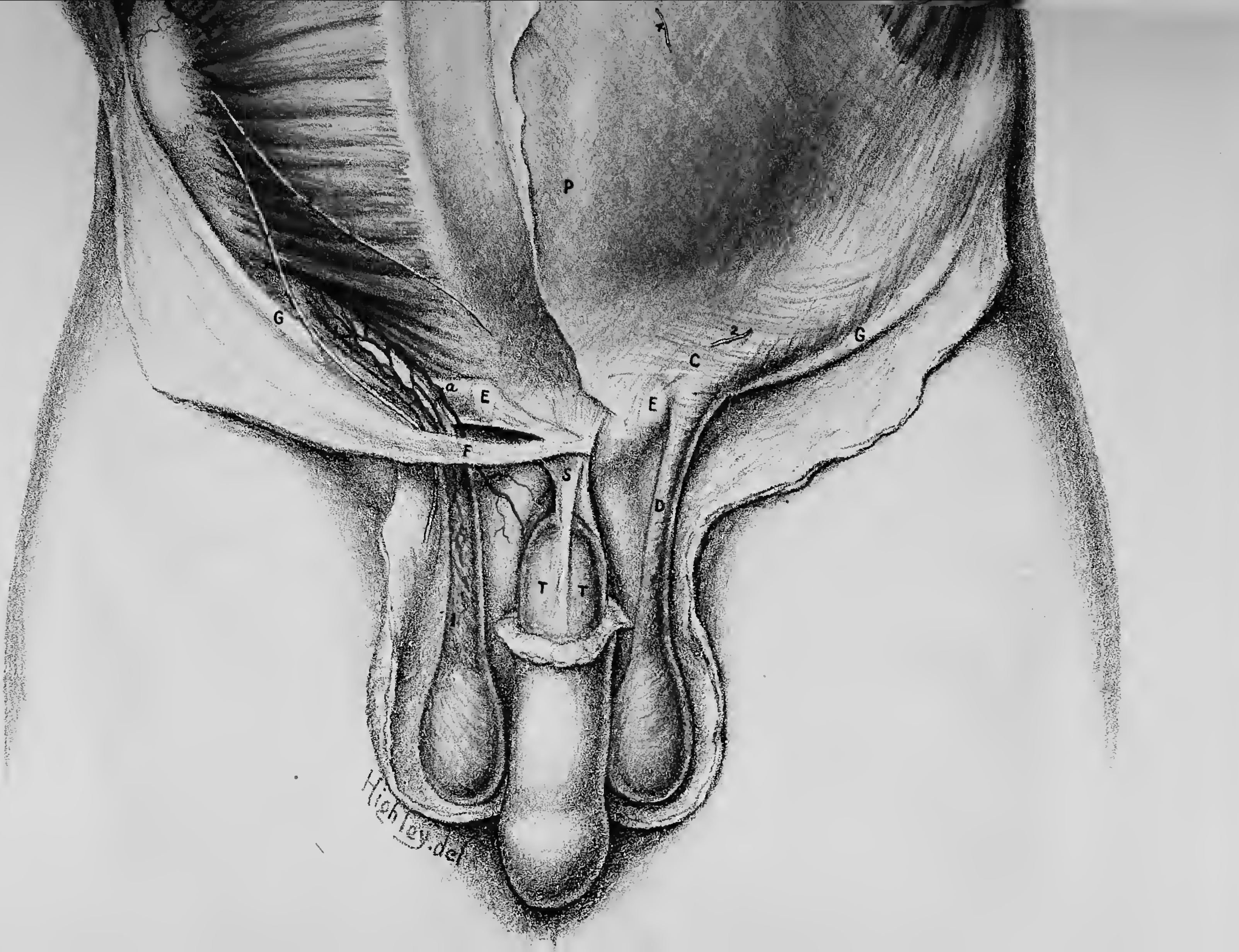
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PLATE LXIII.–LXIV.

DEEP VIEW OF THE FRONT OF THE ABDOMINAL WALL.

This plate represents a deeper dissection on the same body as the previous one. On the right side, the internal oblique has been divided external to the linea semilunaris to expose the transversalis; while on the left the anterior portion of the sheath of the rectus has been stripped off to expose it and the pyramidalis, the oblique and transversalis muscles being cut away to expose the fascia transversalis.

The pyramidalis is specially developed in those animals which possess a marsupial bone.

It will be noticed that the arching fibres of the transversalis springing from Poupart's ligament and passing inwards to join those of the internal oblique (forming the conjoined tendon), leave an oval space which is guarded only by the transversalis fascia. This space is crossed by the deep epigastric artery, and thus divided into two—(i) an external part, the internal abdominal ring; and (ii) an internal, the lower portion of Hesselbach's triangle: the latter is again crossed and strengthened by the obliterated hypogastric artery. Through the internal ring the cord or round ligament passes, and the **oblique form of inguinal hernia** descends when present, following the course of the cord along the inguinal canal, and issuing at the external abdominal ring. It would thus have the following coverings:—1. Peritoneum and subperitoneal tissue; 2. Infundibuliform process of the fascia transversalis; 3. Cremasteric fascia; 4. Intercolumnar fascia; 5. Subcutaneous tissue and skin.

It must be remembered that the testicle in its descent pushes before it a process of peritoneum, the lower part of which remains as the tunica vaginalis, while the upper portion usually becomes obliterated. Should the whole of this process remain unobliterated so that the tunica vaginalis communicates with the peritoneal cavity, the bowel may have to overcome only a slight constriction at the internal ring to at once slip into the canal and descend into the tunica vaginalis, lying in front of the testis—*a congenital hernia*; or should the opening be so small that only the peritoneal fluid can drain into it, this fluid collects in the tunica vaginalis and forms a *congenital hydrocele*. Again, the tunica vaginalis may be cut off from the upper part of the process, and this process remain unobliterated: then the gut may descend into it and *form a hernia into the funicular pouch of the peritoneum*, or *an infantile hernia*.

When the gut descends through the lower part of Hesselbach's triangle—the **direct form**—it may pass on either side of the obliterated hypogastric. If to the outer side—the most common form between it and the deep epigastric artery—it would receive the same coverings as in the oblique form, save that it would push the main part of the fascia transversalis as a covering in front of it instead of entering the infundibuliform prolongation of that fascia through the internal ring. The rarer form is when the gut comes through to the inner side of the obliterated hypogastric artery, and has to push before it or separate the fibres of the conjoined tendon which here strengthens the wall. It thus breaks through the wall opposite the external ring out of which it passes, and it has as coverings: 1. Peritoneum and subperitoneal tissue; 2. Fascia transversalis; 3. Conjoined tendon; 4. Intercolumnar fascia; 5. Skin and subcutaneous tissue.

PLATE LXIII.—LXIV.

MUSCLES, &c.

A External oblique.
A′ Origin of external oblique from ribs.
B Internal oblique.
B′ Placed in front of the conjoined tendon.
C Transversalis.
D Anterior portion of the sheath of rectus.
E Aponeurosis of the right external oblique.
F Rectus.
F′ Edge of right rectus.
G Lineæ transversæ.
H Pyramidalis.
I Fascia transversalis.
I′ Placed on abdominal rings when the infundibuliform process of the fascia is given off.
K Infundibuliform process of the transversalis fascia (the internal spermatic fascia).
L Spine of pubes.
M Suspensory ligament of the penis.
N Upper pillar of the abdominal ring.—reflected
O Vas deferens.
P Poupart's ligament.
S Iliacus muscle, the fascia iliaca being peeled back to expose it.
T External intercostals.
* Hesselbach's triangle.

VESSELS

a Deep epigastric vessels.
b Cremasteric branch of deep epigastric.
c Spermatic.
d Anterior branch of the deep circumflex iliac.
e Deep circumflex iliac.
f A branch of the superior epigastric.

NERVES

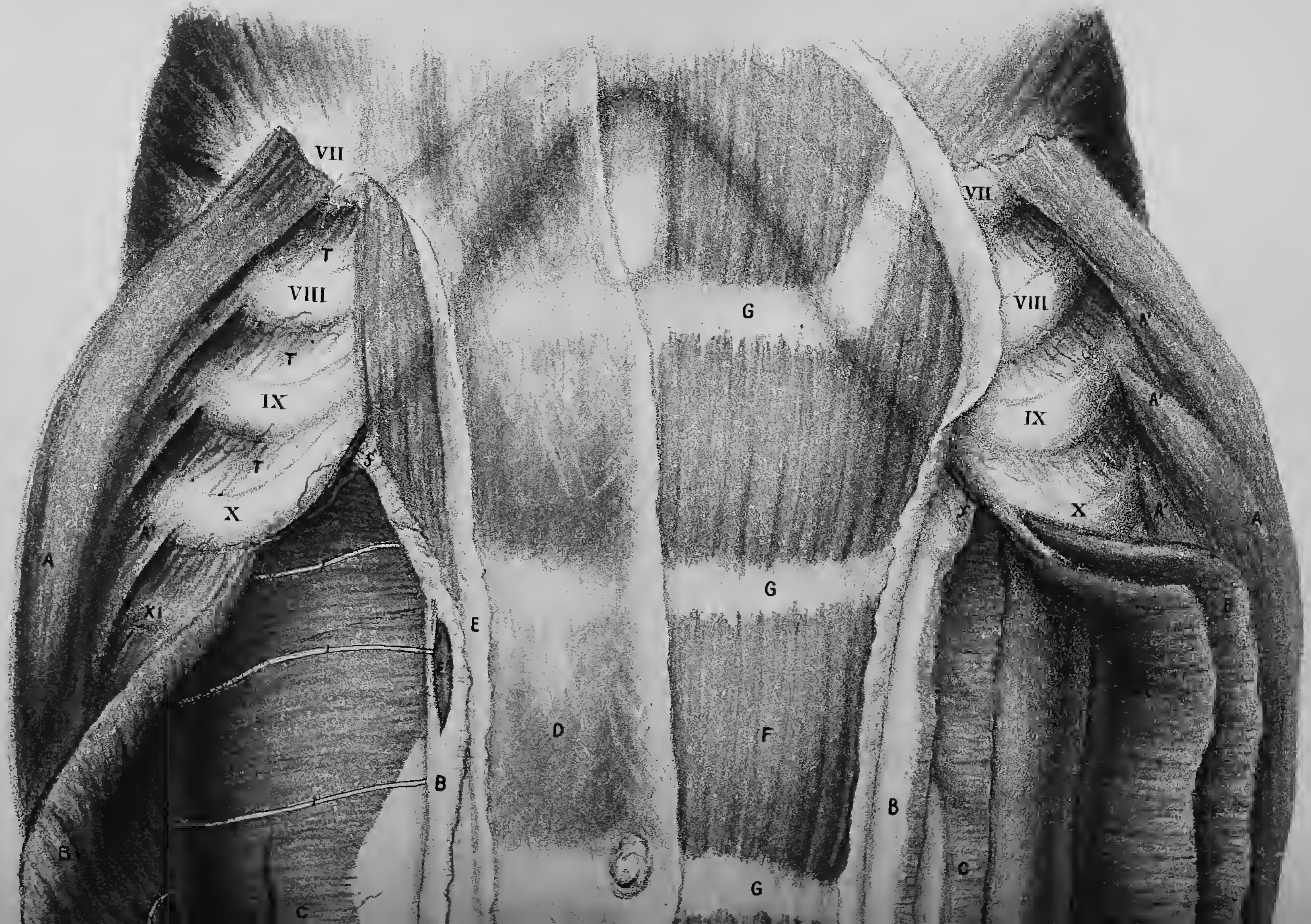
1 Anterior branches of lower intercostals.
2 Muscular branch to internal oblique.
3 External cutaneous.
4 Genital branch of genito-crural.

Hesselbach's triangle extends about 2 inches above the pubic crest, and is $1\frac{1}{2}$ inch broad at its base, and is bounded—

Externally by the deep epigastric artery.
Internally by the outer edge of the rectus.
Below by Poupart's ligament and the external portion of pubic crest.

The **inguinal canal** extends between the abdominal rings; it is about $1\frac{3}{4}$ inch long in the adult, and has the following boundaries:—

In front.—External oblique, and internal in outer third.
Behind.—Fascia transversalis, conjoined tendon in inner half, and triangular ligament.
Floor.—Poupart's ligament.
Roof.—Arching fibres of internal oblique. In the fœtus, the two rings are more or less opposite and the canal is very short; but as the internal ring travels outwards with the growth of the body, so the canal lengthens. The internal abdominal ring is bounded on the outer side by the arching fibres of the transversalis, and on the inner by the deep epigastric artery.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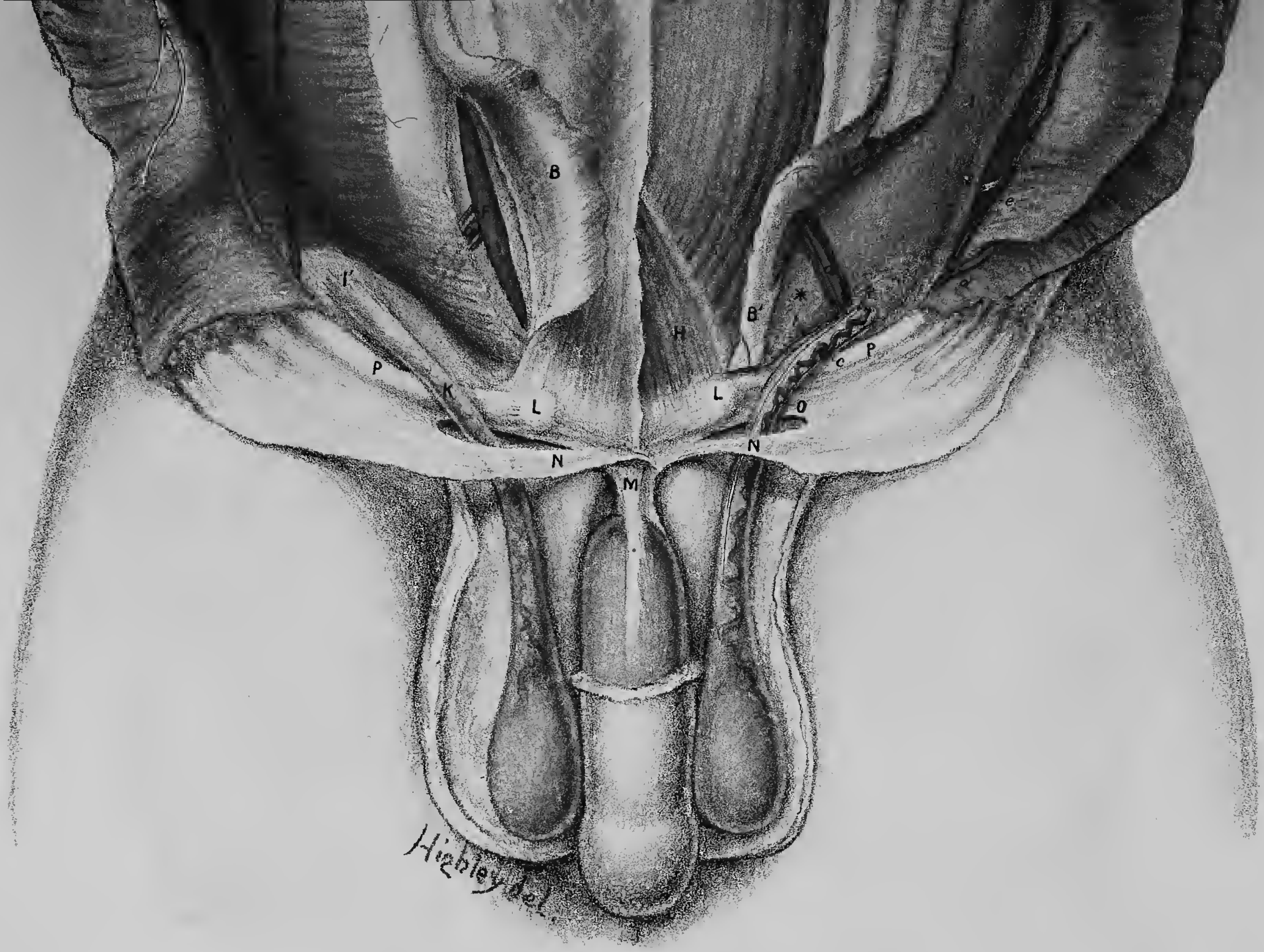
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PLATE LXV.

SUPERFICIAL VIEW OF VISCERA WITH THE ABDOMINAL PARIETES REMOVED.

In the dissection here represented, the abdomen was opened by a longitudinal incision along the linea alba, and a transverse one opposite the umbilicus, taking care to preserve the falciform ligament of the liver when turning back the upper right flap.

For convenience of description the abdomen is usually divided into nine regions by two horizontal lines—one drawn across the abdomen at the level of the ninth rib, and another drawn across at the level of the highest point of the iliac crest—and by two vertical lines which are drawn upwards perpendicularly to the middle of Poupart's ligament, striking the costal arch about the tip of the eighth rib.

Professor Cunningham, in dealing with the delimitation of the regions of the abdomen, suggests that, while keeping the mid-Poupart perpendicular lines, the two horizontal should be drawn at somewhat different levels than they are at present. Taking into consideration the natural division of the abdomen into (1) the part under cover of the ribs, (2) that in front of the iliac bones, and (3) the narrow portion between them devoid of skeletal support, he draws the *upper* or *subcostal* line at a level coinciding with the lowest point of the tenth costal arch—the lowest point of the fixed ribs which is situated in front of the lateral line of the trunk, and is easily ascertained. This plane passes through the upper part of the body of the third lumbar. The *lower* or *intertubercular* line passes through the level of the highest point of the iliac crest seen from the front—that is, between the prominent tubercles which exist at the upper end of the strong bars of bone running from the crest down to the acetabulum on either side. These tubercles are better marked than the anterior superior spines. The only objection to this plane is that it cuts off the upper $1\frac{1}{4}$ inch of the iliac fossa and gives it to the lumbar region; it passes through the middle of the body of the fifth lumbar vertebra.

The line passing through the anterior superior spines is avoided, because the plane drawn through them would cut the sacrum and thus place the upper part of the pelvis and the greater portion of the iliac fossa in the umbilical zone.

The accompanying diagrams show the viscera cut in making a frozen section through the right and left mid-Poupart lines, and are copied from Professor Cunningham's paper.[1] (See next page.)

Right.

1 Liver to right of gall-bladder.
2 The right wall of gall-bladder, cut.
3 Kidney, two-thirds to right, one-third to left.
4 Hepatic flexure of colon, just above beginning of transverse.
5 Termination of ileum. This is the only portion of the small intestine cut.
a Subcostal line.
b Intertubercular line.
c 'Highest point of crest' line.

Left.

1 Spleen, one-third to right, two-thirds to left.
2 Stomach, cut through the greater portion of its length.
3 Liver, cut $1\frac{1}{2}$ inch from left extremity.
4 Kidney; the greater portion is to right of section.
5 Colon, cut in four places:—
    a Summit of splenic flexure.
    b Commencement of descending.
    c Termination of transverse.
    d Sigmoid flexure.
6 Coils of small intestine.

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[1] Professor Cunningham, 'Delimitation of the Regions of the Abdomen,' *Trans. Royal Irish Academy*, vol. xi., and *Journal of Anat. and Phys.* vol. xxvii.

PLATE LXV.

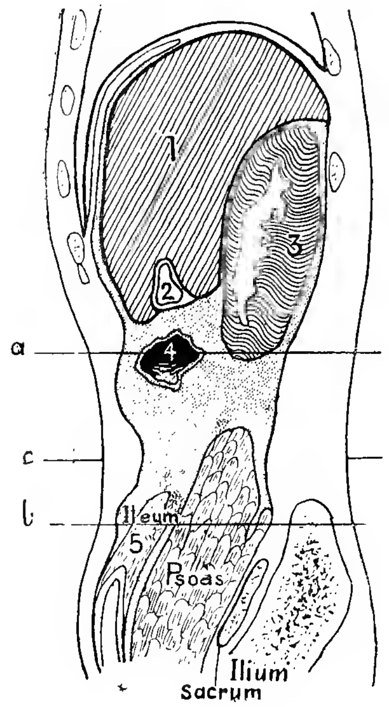
VISCERA, &c.

A Left lobe of liver.
B Right lobe of liver.
C Gall-bladder.
D Stomach.
E Ascending colon.
F Cæcum.
G Transverse colon.
H Sigmoid flexure.
I Bladder.
K Umbilicus.
L Falciform ligament of the liver.
M Round ligament, which lies in the free edge of the falciform, and is the remains of the obliterated umbilical vein.
N Great omentum covering over the greater portion of the small intestines.

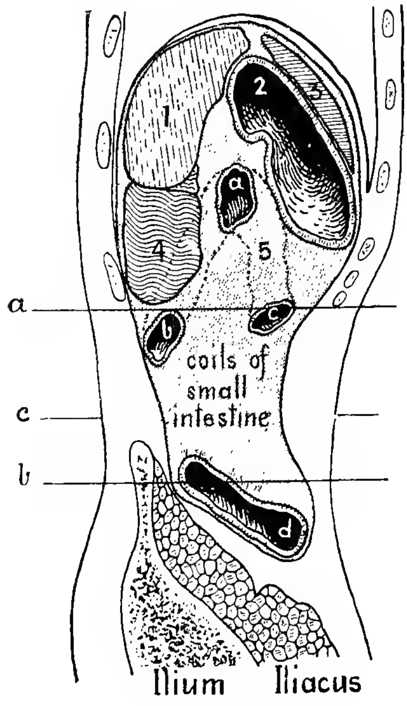
VESSELS

a Deep epigastric arteries.
b Gastric branches of the gastro-epiploics.
c Omental branches of the gastro-epiploics.

Right.



Left.



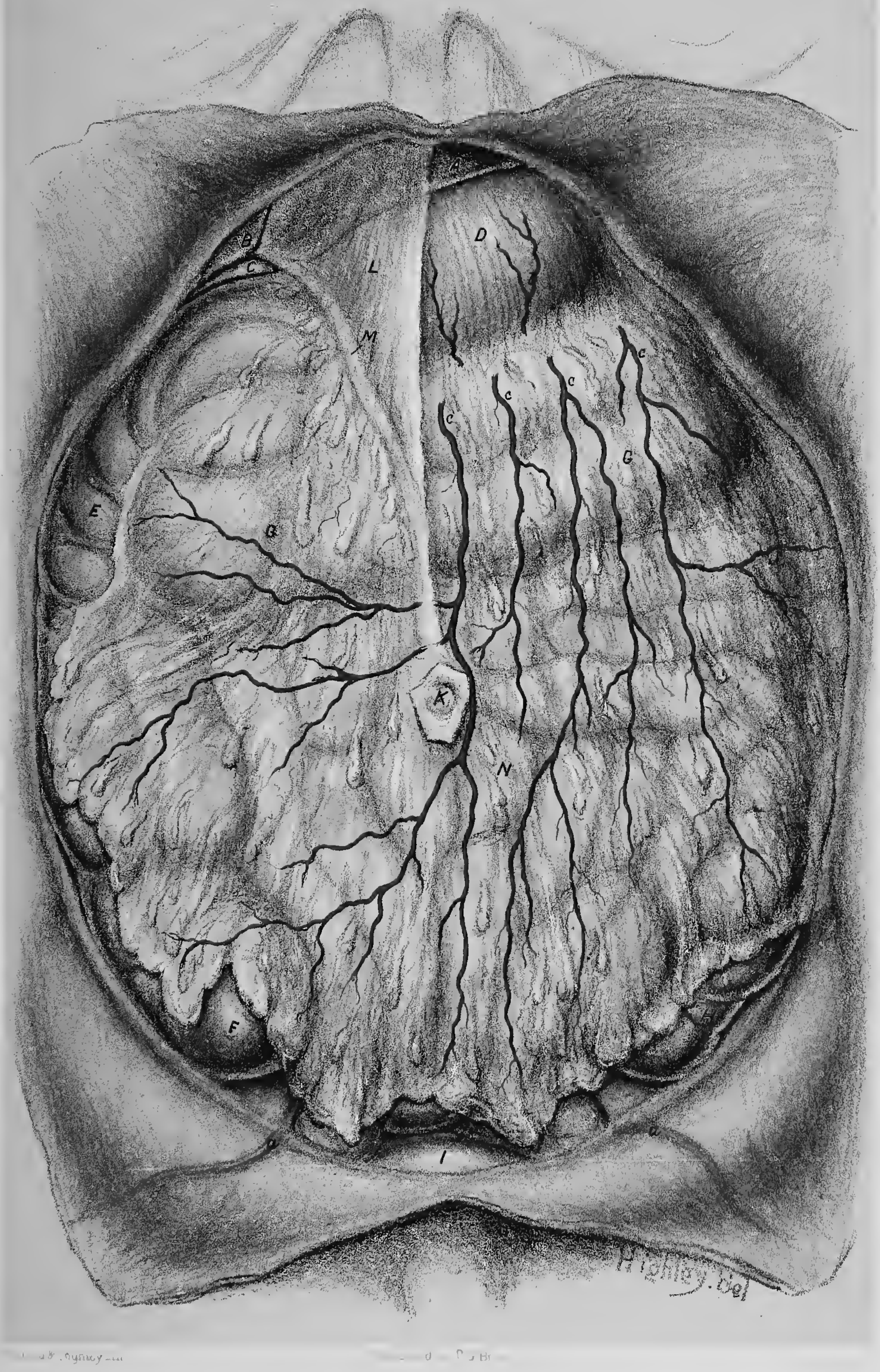

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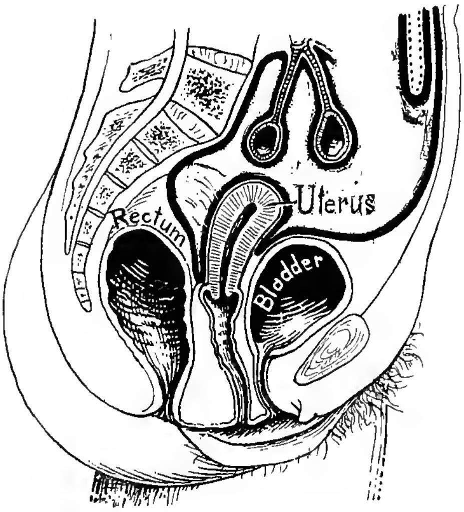
PLATE LXVI.

SECOND VIEW OF THE ABDOMINAL VISCERA—MESENTERY, SUPERIOR MESENTERIC ARTERIES, &c.

In this view the transverse colon has been turned upwards with the omentum and fastened to the wall of the thorax. The anterior layer of mesentery was then dissected away to expose more fully the superior mesenteric vessels which lay between its folds, and the posterior layer of the transverse meso-colon also partially removed to expose the colica media artery and the lower edge of the pancreas.

The morphological ending of the superior mesenteric artery is opposite the vitello-intestinal duct (Meckel's diverticulum), to which it is always directed.

The following diagrams are sections of the abdomen and pelvis in the central line of the body, showing the reflections of the peritoneum, the cavity of the lesser sac being shaded.



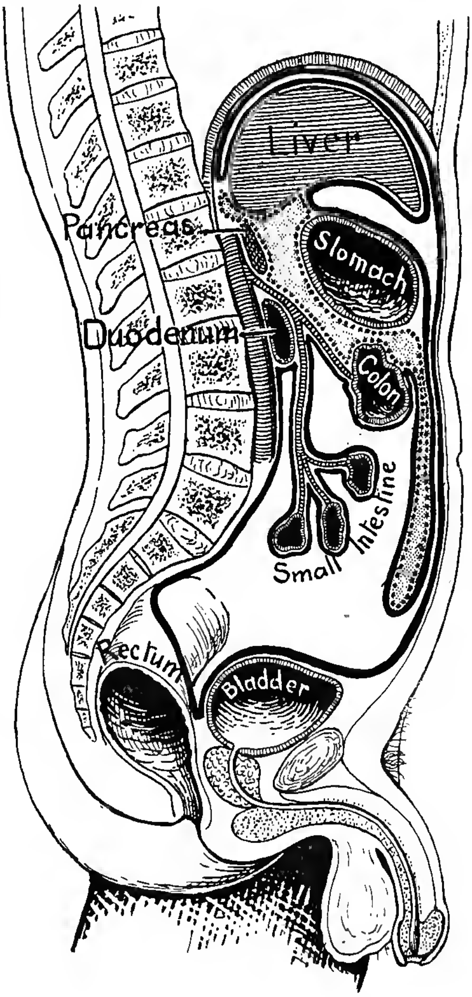


PLATE LXVI

VISCERA, &c.

A Cæcum.
B Upper end of the ascending colon.
C Transverse colon.
D An appendix epiploica.
E Great omentum.
F Transverse meso-colon. The letter is placed on the posterior layer, formed by the greater sac of the peritoneum, which has been partly cut away to expose the artery.
G Upper layer of the transverse meso-colon, formed by the lesser sac of the peritoneum.
H Mesentery.
I Splenic flexure of the colon.
K Second or descending portion of the duodenum.
K′ Third or transverse portion of the duodenum.
L Pancreas.
M Lower end of the ileum.
N Small intestine.

VESSELS, &c.

a Superior mesenteric artery.
b Superior mesenteric vein.
c Meso-colic artery.
d An accessory meso-colic.
e A common trunk of origin of the colica sinistra and ileo-colic.
f Colica sinistra.
g Ileo-colic.
h Vasa intestini tenuis.

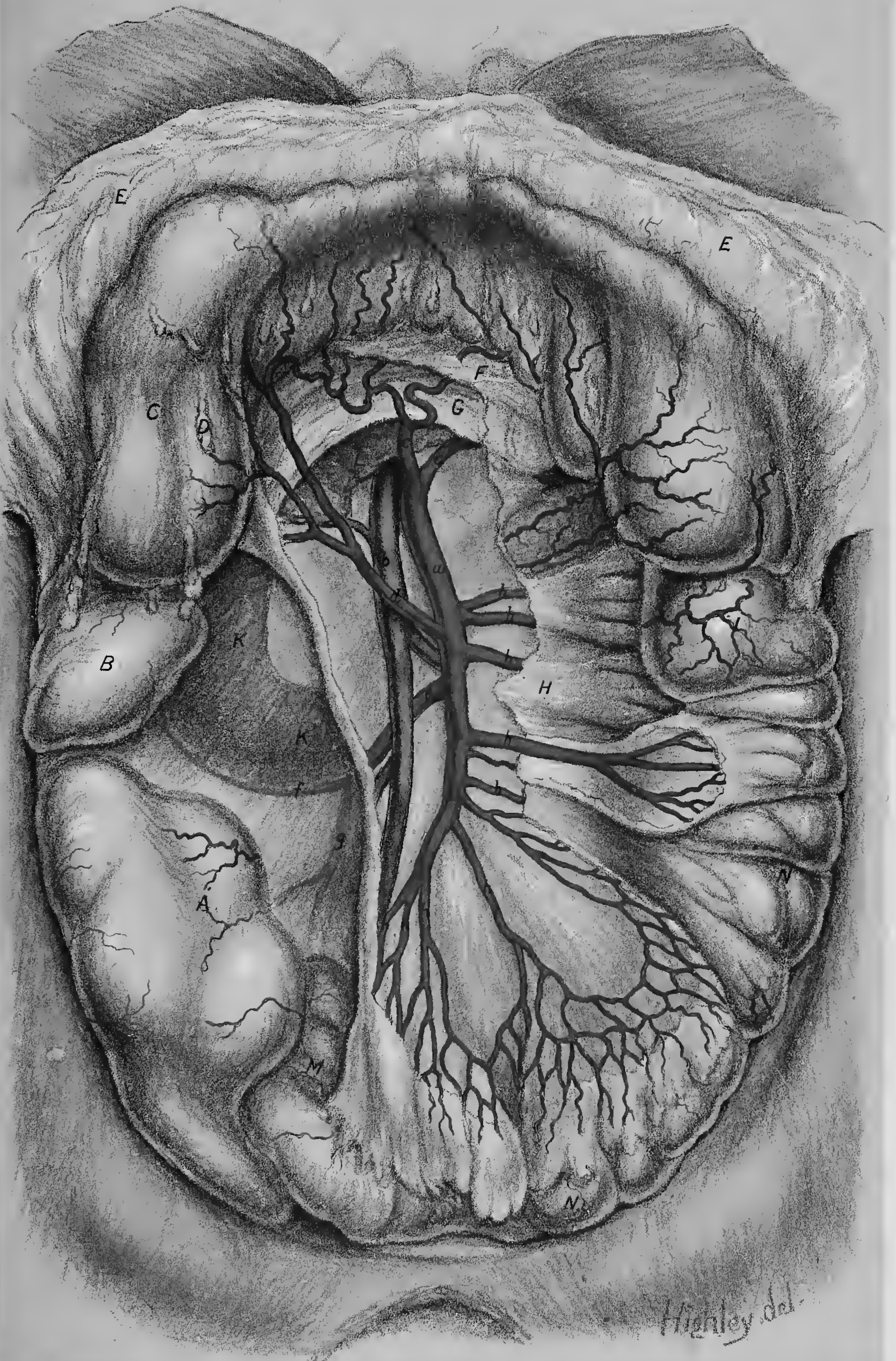


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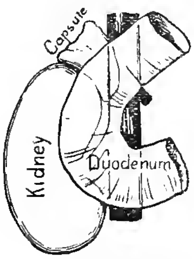
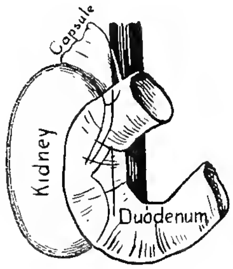
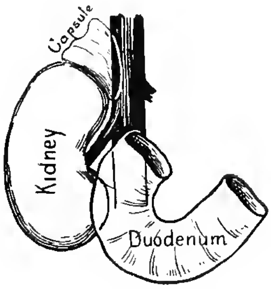
PLATE LXVII.

THE THIRD VIEW OF THE ABDOMINAL VISCERA.

In this plate the transverse colon has been cut away between the hepatic and splenic flexures. The stomach has been drawn forward to the thoracic wall, exposing its posterior surface. The small intestine has been removed with the mesentery, which has been cut short, and its anterior layer removed to expose the remains of the superior mesenteric vessels. Part of the posterior wall of the abdomen has been denuded of peritoneum, to expose the aorta and inferior mesenteric vessels. The posterior layer of the lesser sac has also been reflected off the posterior wall of the abdomen to expose more of the body of the pancreas.







The accompanying diagrams were copied from Professor Cunningham's paper [1] on the abdomen, to illustrate the varying relations of the duodenum and kidney due to the alteration in height of the latter.

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[1] On reference to Professor Cunningham's *Manual of Practical Anatomy* I find the diagrams were drawn by Dr. St. John Brooks.

PLATE LXVII.

VISCERA

A Posterior surface of the stomach.
B Cut edge of the great omentum.
C Ascending or posterior layer of the lesser sac of the peritoneum.
D Pancreas.
E Second portion of the duodenum.
F Third or transverse portion of the duodenum.
G So-called fourth portion of the duodenum ascending to end in
H Jejunum.
I Right lobe of liver.
K Gall-bladder.
L Cæcum.
M Ascending colon.
N Lower part of ileum.
O Vermiform appendix.
P Splenic flexure of colon.
R Descending colon.
S Sigmoid flexure of colon.
T First portion of rectum.
V Bladder.
W Placed on the sacro-vertebral angle.
X Peritoneum covering the posterior abdominal wall.
Y Posterior layer of the mesentery.

VESSELS

a Aorta.
b Common iliacs.
c External iliac.
d Inferior mesenteric.
e Colica sinistra.
f Superior hæmorrhoidal.
g Superior mesenteric.
h Colica media.
i Gastro-duodenal.
k Gastro-epiploica dextra.
l Superior pancreatico-duodenal.
m Inferior pancreatico-duodenal.
n Colica dextra.
o Ileo-colic splitting into branches to
p The colon.
r Ileum and cæcum.
s Vasa intestini tenuis.
t Superior mesenteric vein.
v Inferior mesenteric vein.
x Sacra media.

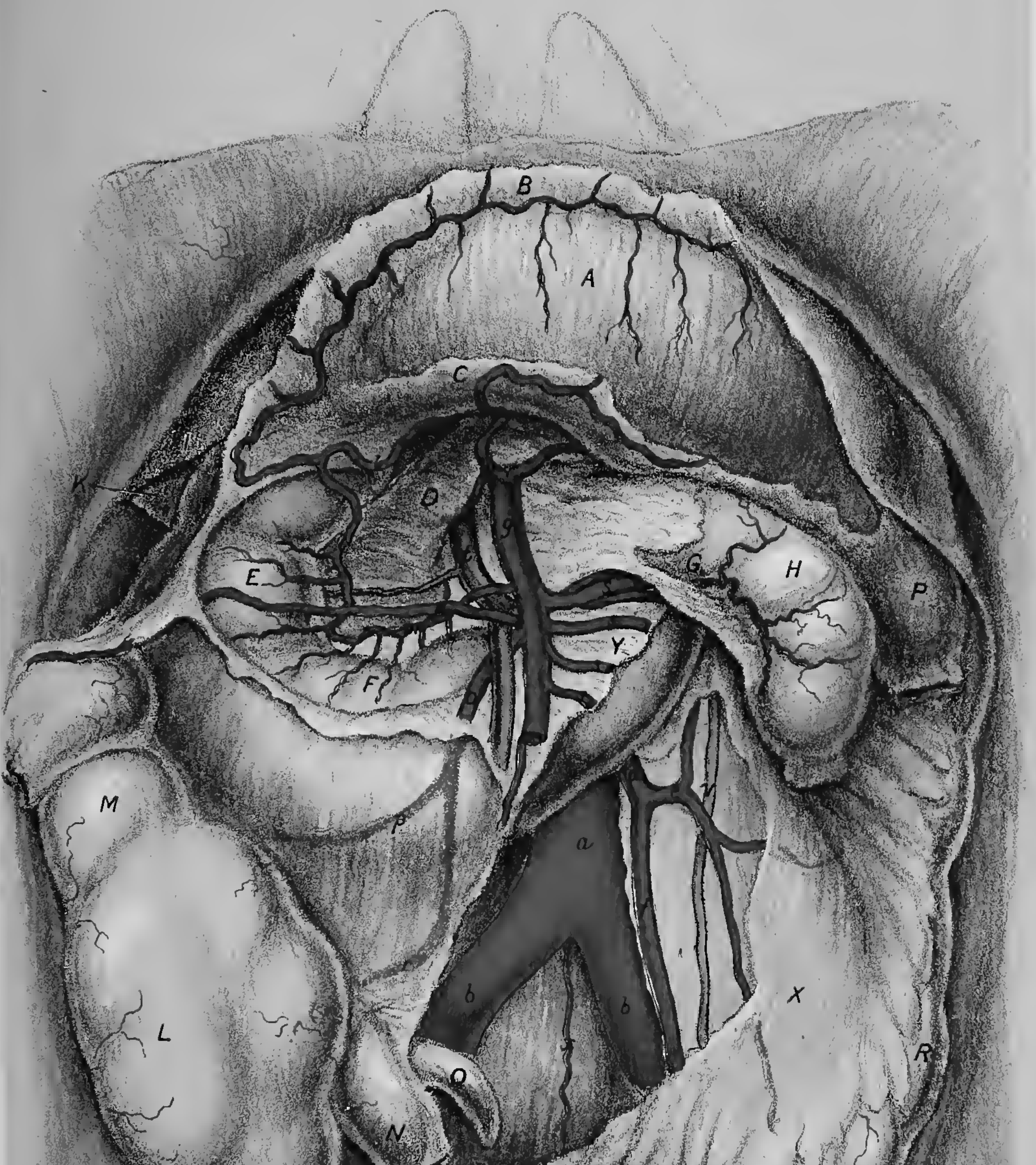
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PLATE LXVIII.

THE FOURTH VIEW OF THE ABDOMINAL VISCERA—PORTAL VEIN, PANCREAS AND SPLEEN, &c.

In this dissection the stomach, duodenum, and transverse colon were removed, and the liver stitched to the anterior wall to display the contents of the lesser omentum—viz. the common bile-duct, formed by the junction of the hepatic and cystic ducts, lying in front and to the right, the hepatic artery to the left and on a plane slightly posterior, the portal vein being seen behind and between the other two. The spleen has been left resting on the costo-colic ligament, a process of peritoneum which extends from the splenic flexure of the colon to the tenth and eleventh ribs.

The portal vein is about three inches long, and usually commences at the upper border of the pancreas by the junction of the superior mesenteric and splenic veins. In 66 per cent. of cases the inferior mesenteric joins the splenic, and in 33 per cent. it joins the superior mesenteric, while in the remaining 1 per cent. it runs into the junction of the two veins. The ending of the inferior mesenteric vein in the splenic appears to be a feature in the higher development of animals, as in all mammalia below monkeys it opens into the superior (Treves). The portal system has no valves, and communicates with the systemic venous system at

1. The rectum (superior with middle and inferior hæmorrhoidal).
2. The œsophagus (gastric with the œsophageal).
3. Small veins of duodenum and pancreas with the left renal.
4. The superficial portal capillaries and the capillaries in the falciform ligament of the liver with the phrenic veins.
5. Along the round ligament there are often one or more small veins which form a communication with the epigastric veins, and in certain diseased states of the liver are often much dilated. They are called the parumbilical veins, 'and may represent the anterior abdominal vein or suprahepatic termination of the hypoblastic vein' (Macalister).

PLATE LXVIII.

VISCERA, &c.

A	Pancreas.
B	Spleen.
C	Right lobe of liver.
D	Left lobe of liver.
E	Quadrate lobe of liver.
F	Ascending colon.
G	Termination of ileum.
H	Vermiform appendix.
I	Descending colon.
K	Costo-colic ligament.
L	Sigmoid flexure.
M	Transverse colon (cut), just beyond hepatic flexure.
N	Bladder.
O	Cut edge of posterior parietal layer of greater sac of peritoneum descending into pelvis.
P	Kidneys.
Q	Ureter.
R	Gall-bladder.
S	Cystic duct.
T	Hepatic duct.
V	Common bile-duct.
W	Mesentery.
X	Psoas.
Y	Diaphragm.

VESSELS

a	Abdominal aorta.
b	Common iliac artery.
c	Vena cava inferior.
d	Gastric artery (cut).
e	Hepatic artery.
f	Cystic branch of *e*.
g	Gastro-duodenal branch of *e*.
h	Portal vein.
i	Splenic artery.
k	Superior mesenteric artery.
m	Vasa intestini tenuis branches of *k*.
n	Ileo-colic branch of *k*.
o	Colica dextra branch of *k*.
p	Colica media branch of *k*.
q	Superior mesenteric vein.
r	Renal artery.
s	Renal vein.
t	Spermatic artery.
v	Right spermatic vein.
w	Left spermatic vein.
x	Inferior mesenteric artery.
y	Colica sinistra branch of *x*.
z	Sigmoidean branches of *x*.
+	Superior hæmorrhoidal branch of *x*.
*	Inferior mesenteric vein.
†	Capsular vein.

NERVES

1	Left semilunar ganglion.
2	Hepatic plexus of sympathetic.
3	Renal plexus of sympathetic.
4	Spermatic plexus of sympathetic.
5	Left sympathetic trunk.
6	Inferior mesenteric plexus of sympathetic.
7	Left splanchnic nerve.

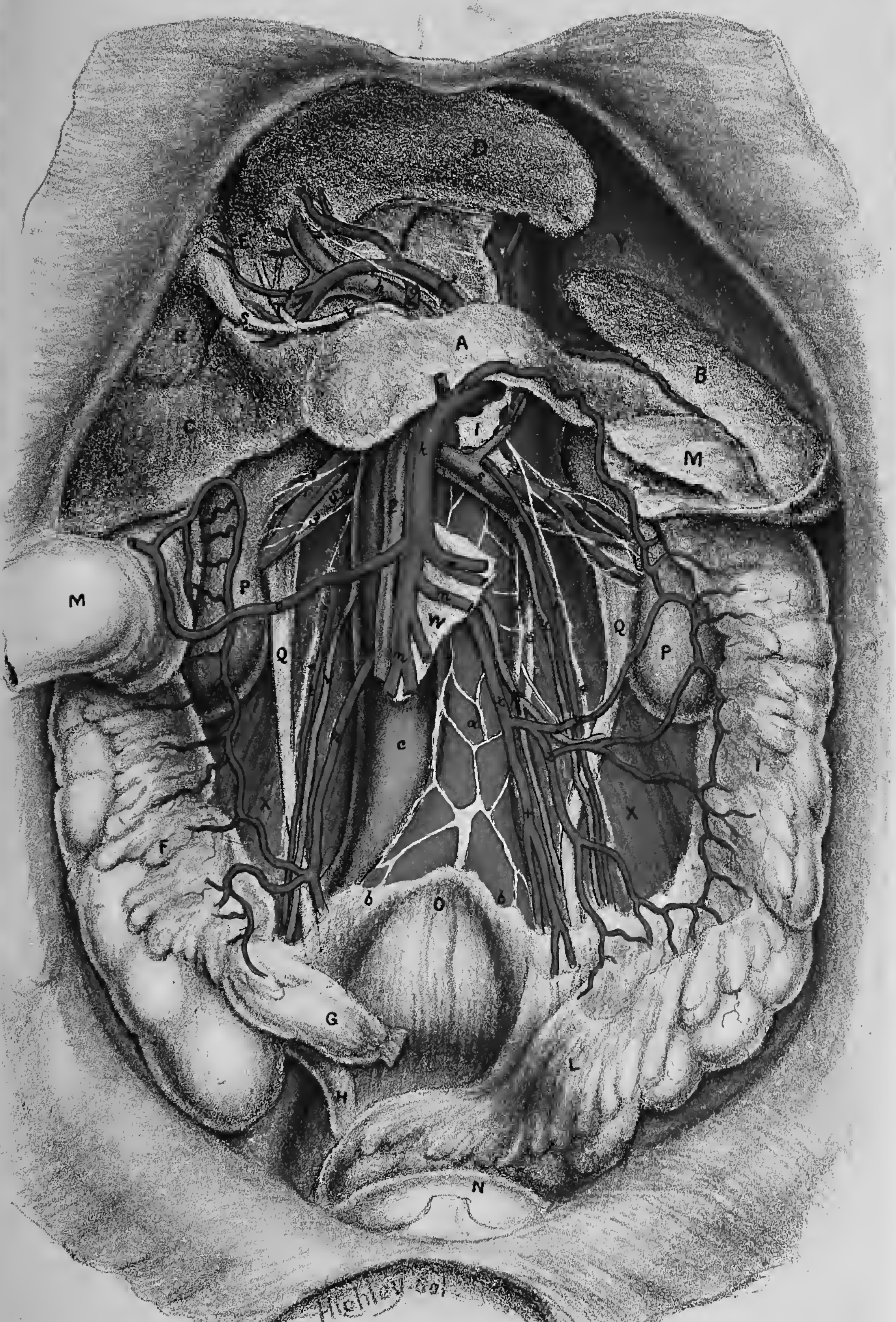
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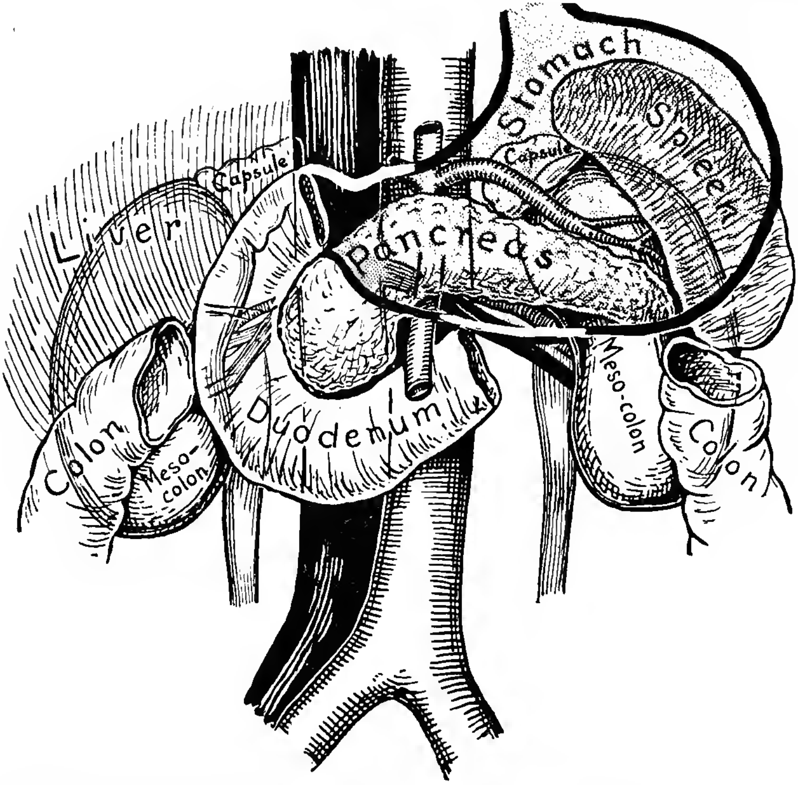
PLATE LXIX.

POSTERIOR WALL OF ABDOMEN—KIDNEYS AND SPLEEN.

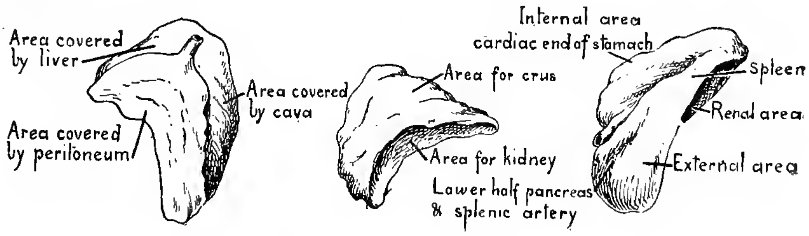
This plate is taken from the same body as the preceding. The pancreas, ascending and descending colon, sigmoid flexure, and the liver, excepting a small portion surrounding the vena cava, have been removed. Thus the kidneys, almost the entire length of the vena cava, and most of the branches of the abdominal aorta have been exposed.

The following diagram shows the anterior relations of the kidneys, but it should be borne in mind that these necessarily alter somewhat with each individual, according to the height of the kidney above the iliac crest, and therefore can only be taken as a mean.



The height of the lower edge of the kidneys above the iliac crest varies very considerably, but on the whole the left is usually placed a little higher than the right.

As the suprarenal bodies are not usually well seen in the dissecting-room, the accompanying diagrams taken from Dr. Rolleston's paper [1] illustrate their general form and relations.


Area covered by liver
Area covered by peritoneum
Area covered by cava
Area for crus
Area for kidney
Internal area cardiac end of stomach
Spleen
Renal area
External area
Lower half pancreas & splenic artery

Right Capsule.
Anterior Surface

Right Capsule.
Posterior Surface

Left Capsule.
Anterior Surface

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[1] *Journal of Anat. and Phys.* vol. xxvi. p. 548.

PLATE LXIX.

VISCERA

A Diaphragm.
B Psoas magnus.
C Quadratus lumborum.
D Transversalis.
E Crest of ilium.
F Iliacus.
G Psoas parvus.
H Fifth lumbar vertebra.
I Remains of liver.
K Spleen.
L Kidney.
M Ureter.
N Bladder.
O Vas deferens.
P Œsophageal opening in diaphragm.
Q Diaphragm covering aorta and forming aortic tunnel.

VESSELS

a Abdominal aorta.
b Vena cava inferior.
c Right phrenic artery.
d Left phrenic artery.
e Cœliac axis.
f Hepatic artery.
g Gastric.
h Splenic.
i Superior mesenteric.
k Renal artery.
l Spermatic.
m Abdominal branch of first lumbar artery.
p Iliac branch of ilio-lumbar.
q Inferior mesenteric.
r Sacra media.
s Common iliac.
t Internal iliac.
u External iliac.
w Circumflex iliac.
x Deep epigastric.
y Left common iliac vein.
z Right common iliac vein.
α Sacra media vein.
β Right spermatic vein.
γ Left spermatic vein.
δ Left renal vein.
ε Right renal vein.

NERVES

1 Left semilunar ganglion.
2 Part of right semilunar ganglion.
3 Left great splanchnic.
4 Left sympathetic trunk.
5 Solar plexus of the sympathetic.
6 Renal plexus of the sympathetic.
7 Spermatic plexus of the sympathetic.
8 Aortic plexus of the sympathetic.
9 Hypogastric plexus of the sympathetic.
10 Last dorsal nerve.
11 Placed between the iliac and hypogastric branches of the ilio-hypogastric.
12 Ilio-inguinal.
13 External cutaneous.
14 Anterior crural.
15 Muscular branch to iliacus.
16 Genito-crural.
17 Right sympathetic trunk.

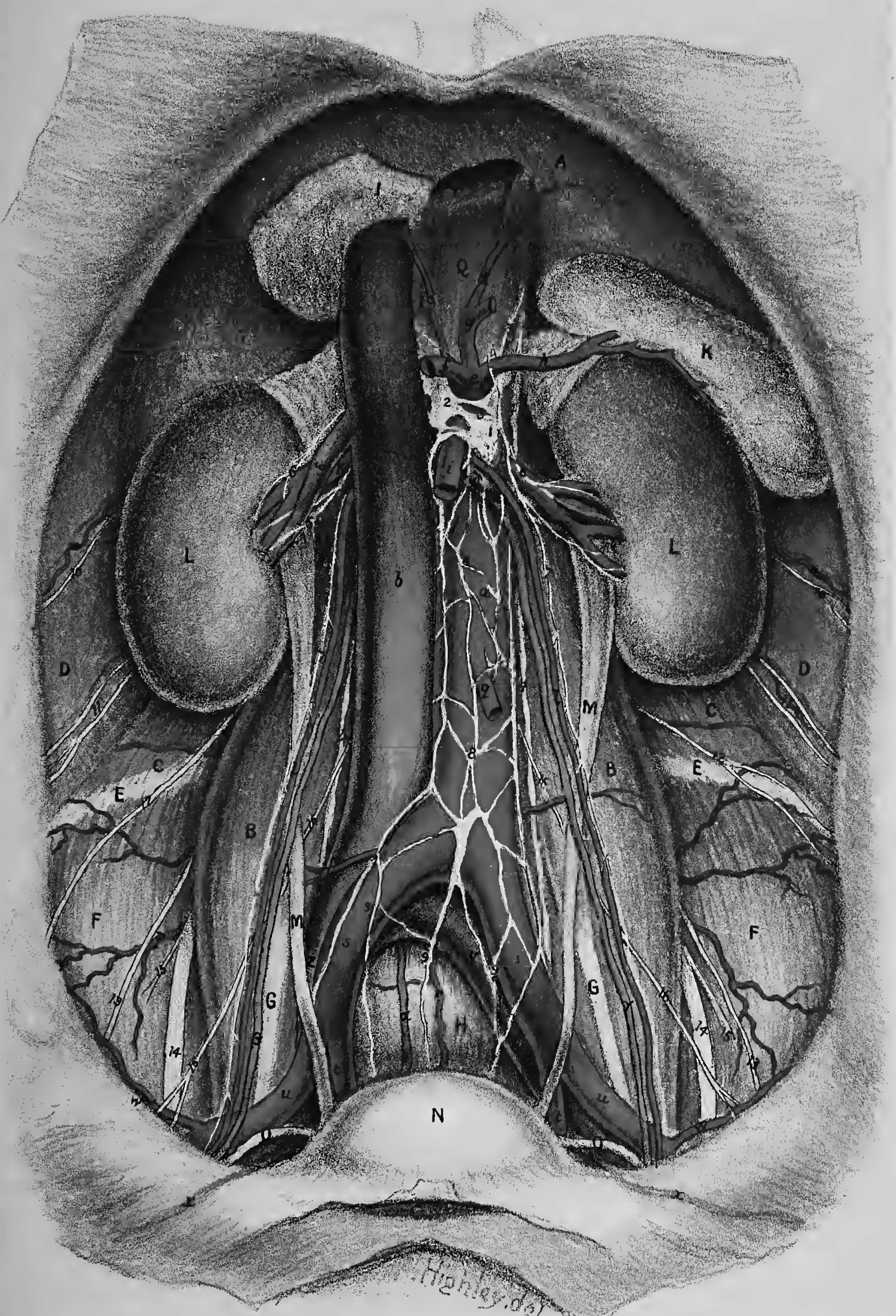A
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PLATE LXX.

POSTERIOR WALL OF ABDOMEN—LUMBAR PLEXUS.

This dissection is a continuation of same subject as in the last plate. The inferior vena cava and the remains of the liver have been removed, exposing the right splanchnic nerve, semilunar ganglion, and crus of diaphragm; the lumbar arteries are seen coming off from the aorta. The kidney, psoas parvus, and magnus have been removed on the left side to allow the lumbar plexus to be dissected out. The communications with the sympathetic are well seen. The ilio-lumbar artery is given off from the common iliac instead of the posterior trunk of the internal iliac, and this mode of origin is by no means uncommon. On the left side the body of the pubes has been removed to expose the internal iliac vessels and their branches.

The following diagram shows a scheme of the lumbar plexus; the posterior divisions of the nerves have been shaded. The so-called accessory obturator would be better named 'accessory anterior crural,' (1) because in its origin it is more nearly allied to that nerve; (2) because of its course over the pubic ramus; (3) because it supplies a portion of the pectineus muscle in place of the anterior crural.

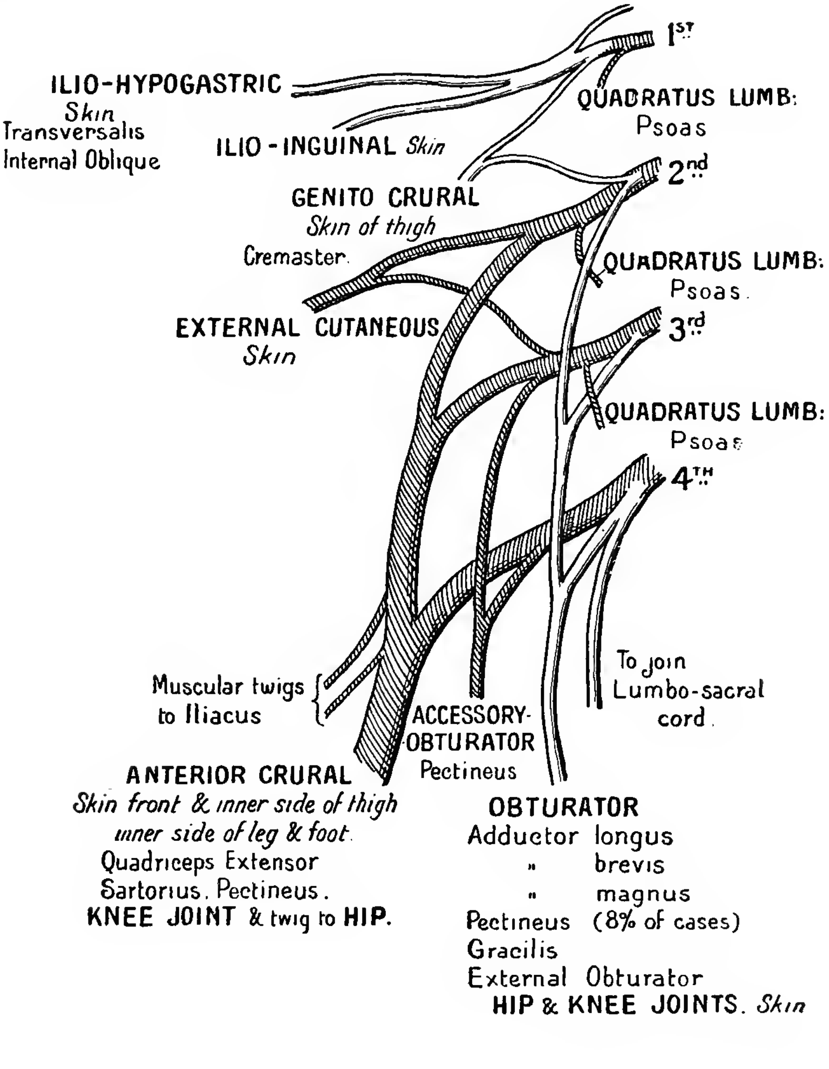

PLATE LXX.

MUSCLES

A Diaphragm.
B Quadratus lumborum.
C Transversalis.
D Right psoas.
E Iliacus.
F Crest of ilium.
G Right crus of diaphragm.
G′ The origin of the right crus of the diaphragm from the anterior common ligament.
H Placed over aortic tunnel.
I Fifth lumbar vertebra (lower border).
K Poupart's ligament.
L Opening in diaphragm for vena cava.
M Œsophageal opening in diaphragm.
N Bladder.
O Spleen.
P Right kidney.
R Right ureter.
S Right vas deferens.
T Anterior common ligament. (The letter is placed over the disc between the third and fourth lumbar vertebræ.)

VESSELS

a Aorta.
b Commencement of inferior cava.
c Common iliac artery.
d Internal iliac artery.
e External iliac artery.
f Circumflex iliac artery.
g Right common iliac vein.
h Left common iliac vein.
i External iliac vein.
k Left internal iliac vein.
l Right phrenic artery.
m Left phrenic artery.
n Cœliac axis.
o Gastric branch of cœliac axis.
p Hepatic branch of cœliac axis.
q Splenic branch of cœliac axis.
r Superior mesenteric artery.
s Renal arteries.
t Spermatic artery.
u, u_1, u_2, u_3, Lumbar arteries.
w Inferior mesenteric artery.
x Sacra media.
y Left ilio-lumbar.
z Iliac branch of right ilio-lumbar.
α Obturator artery.
β Internal pudic.
γ Sciatic.
δ Gluteal.
ε Superior vesical.
η Middle vesical.
θ Lateral sacral.

NERVES

1 Left semilunar ganglion.
2 Right semilunar ganglion.
3 Solar plexus of sympathetic.
4 Upper part of aortic plexus of the sympathetic.
5 Left great splanchnic.
6 Right great splanchnic.
7 Sympathetic trunk.
8 Communication between the sympathetic and the lumbar nerves.
9 Last dorsal nerve.
10 Placed between the iliac and hypogastric branches of ilio-hypogastric.
11 Ilio-inguinal.
12 Genito-crural.
13 Anterior crural.
14 Muscular branch to iliacus.
15 External cutaneous.
16 Obturator.
17 Lumbo-sacral cord.
18 Part of the sacral plexus.

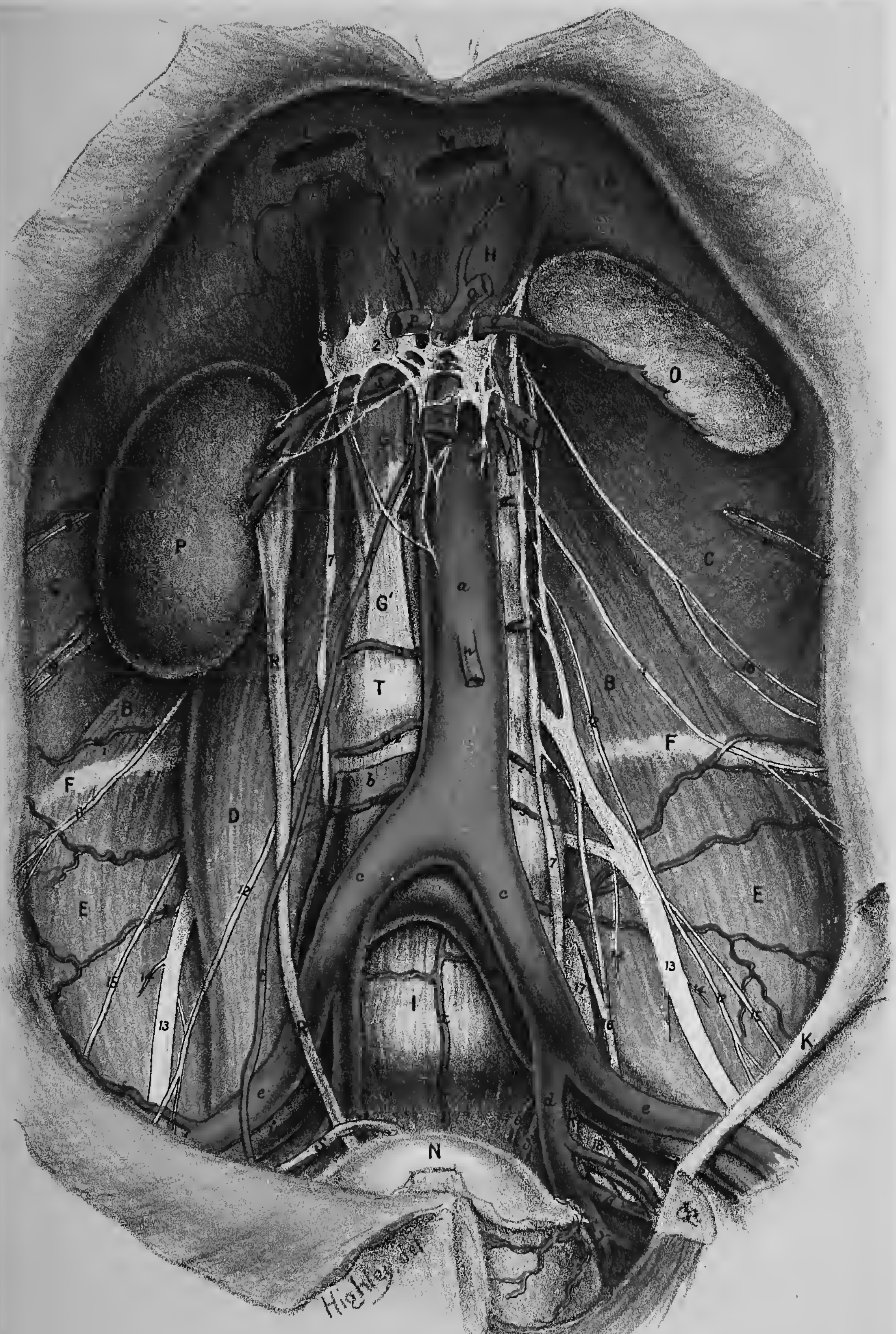L
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PLATE LXXI.

FIRST SIDE VIEW OF A MALE PELVIS.

In the dissection represented in the plate the right innominate bone was sawn through the body of the pubis at the inner end of the thyroid foramen in order to save the attachment of the pelvic fascia. The bone was then disarticulated from the sacrum, the spine of the ischium being first severed at its base, and hooked up into position. Thus the attachments of the coccygeus and levator ani are preserved in their normal positions. The ischio-rectal fossa was then dissected from the side, and a part of the lateral wall of the bladder cleared to show the muscular coat. The so-called white line of the pelvic fascia is not clearly shown. It extends from the spine of the ischium to the body of the pubes, and is supposed to mark the limit of origin of the levator ani; but the fibres of this muscle often separate the obturator from the recto-vesical fascia higher than this line.

The plate also shows how, by distending the rectum and then inflating the bladder, the anterior non-peritoneal surface of the latter is brought into contact with the abdominal wall, and the peritoneum carried upwards. This fact is taken advantage of in doing a suprapubic lithotomy.

The tissue between the bladder and posterior surface of the pubes is very lax, and can be easily broken down by the finger, leaving a cavity, the space of Retzius. According to Brauné, the transversalis fascia splits at the umbilicus, one layer following the urachus down to the bladder, and the other passing over the abdominal wall to the back of the pubes ; and it is the interval between these layers that forms the space above mentioned, and it is into this space that the bladder rises when distended. In the fœtus the bladder lies against the abdominal wall, and 'in the deficient wall of the rectal sheath we have a trace of the original situation of the viscus, the upper border of which is marked by the semilunar line of Douglas ' (Macalister).

In a male child at birth the urethra enters the bladder opposite the upper border of the symphysis, and the bladder occupies the lower two-thirds of the space between umbilicus and pubes. The peritoneum extends far more to the base of the bladder than in the adult, and this may account for the fact that in children the main cause of death after perineal lithotomy is due to injury of this membrane.

PLATE LXXI.

VISCERA, &c.

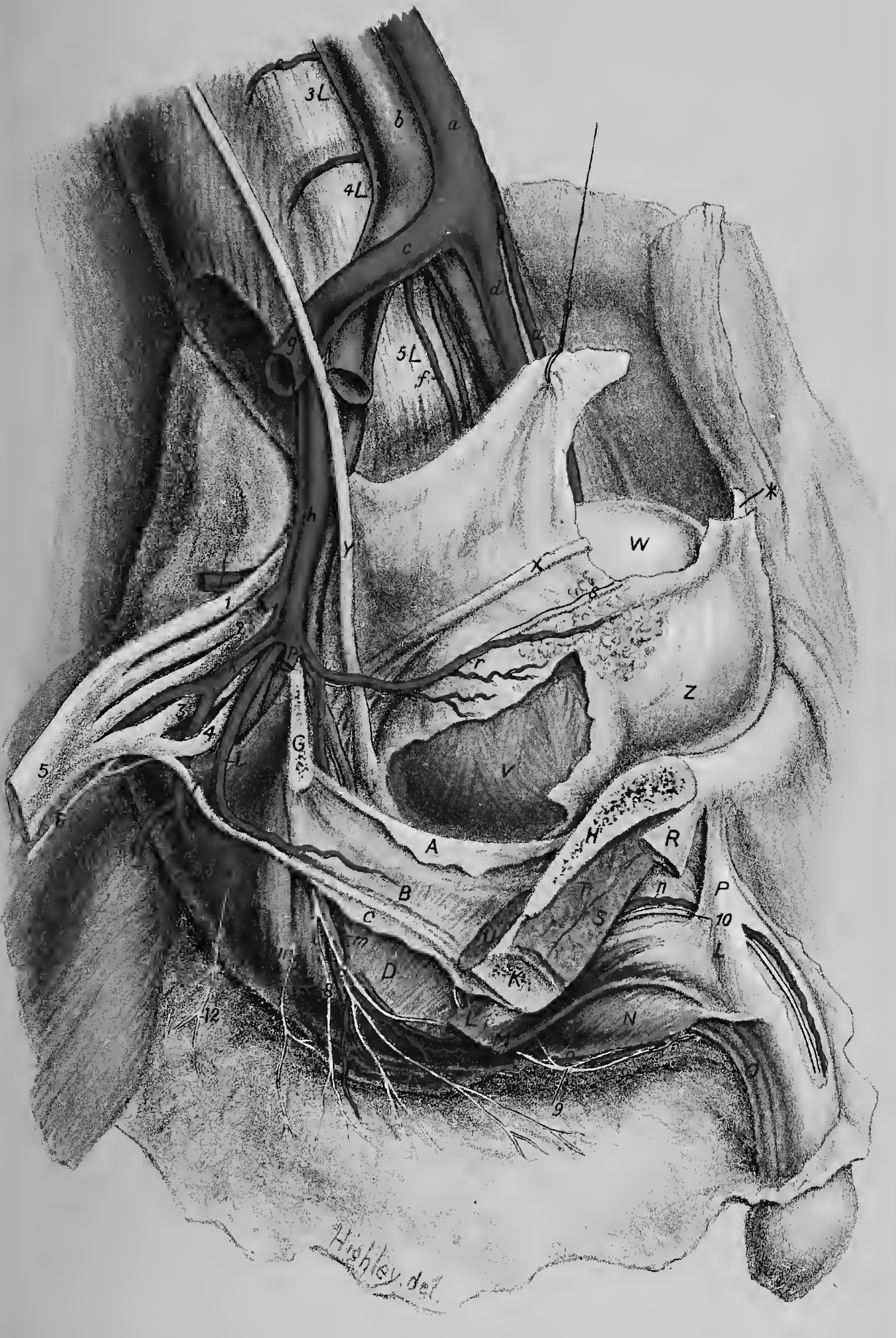
A Pelvic fascia.
B Obturator fascia.
C Placed below Alcock's canal for the internal vessels and nerve.
D Levator ani covered by anal fascia.
E Sphincter ani.
F Coccygeus.
G Spine of ischium.
H Section of body of the pubes.
K Section of descending ramus of the pubes.
L Corpus cavernosum.
L′ Origin of corpus cavernosum from the ramus of ischium (crus penis).
M Erector penis.
N Accelerator urinæ.
O Corpus spongiosum.
P Suspensory ligament of penis.
R Origin of adductor longus.
S Origin of adductores brevis and magnus.
T Origin of obturator externus.
U Origin of obturator internus.
V Muscular coat of bladder.
W Placed on the lateral surface of bladder where it is covered by peritoneum.
X Vas deferens.
Y Ureter.
Z Placed on the loose cellular tissue covering the anterior surface of the bladder.
* Urachus.

VESSELS

a Aorta.
b Inferior vena cava.
c Right common iliac.
d Left common iliac.
e Lumbar arteries.
f Sacra media.
g Right external iliac.
h Right internal iliac.
i Gluteal.
k Sciatic.
l Internal pudic.
m Inferior hæmorrhoidal.
n Dorsal artery of the penis.
o Superficial perineal.
p Obturator artery.
r Superior vesical.
s Obliterated hypogastric.
t Inferior vesical.
u Superior hæmorrhoidal.

NERVES

1 Lumbo-sacral cord.
2 First
3 Second } sacral nerves.
4 Third
5 Great sacro-sciatic.
6 Small sacro-sciatic.
7 Internal pudic.
8 Inferior hæmorrhoidal.
9 Superficial perineal.
10 Dorsal nerve of penis.
11 Perineal branch of fourth sacral.
12 Accessory twig from fourth sacral to skin.



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Dissected by G G Brodie

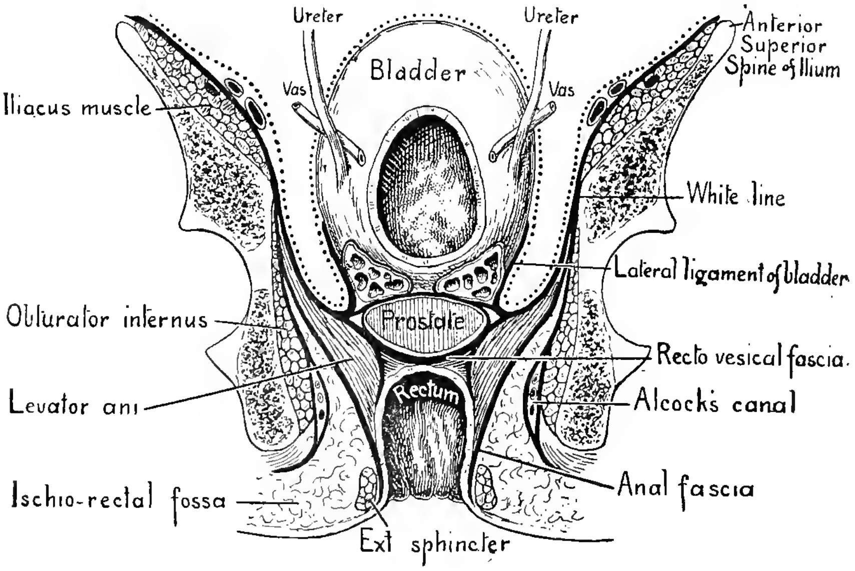
Hanhart imp

PLATE LXXII.

SECOND SIDE VIEW OF A MALE PELVIS.

In this dissection, which is a continuation of that represented in the previous plate, the spine of the ischium has been turned down with the coccygeus muscle, and the levator ani separated from the spine and also turned down, being cut away from its attachment to the pubes. The capsule of the prostate has been opened to expose the gland. Fig. II. shows a side view of the levator ani muscle.

The accompanying diagram has been introduced to show the reflections of the pelvic fascia. The plane of section passes from the anterior superior iliac spine through the anus. The so-called white line in the diagram has been shown as the point of splitting of the obturator from the recto-vesical fascia, although the levator ani often by its higher origin splits the two fasciæ farther up. It also shows clearly how the ischio-rectal fossa is bounded on the sides by the obturator and anal fasciæ.



Dr. Symington,[1] in making frozen sections of the pelvis, has proved that the usual description of the last part of the rectum is incorrect. He finds, 1st, that the second portion of the rectum is sacculated, and not a cylinder—the valves of Houston being situated between the sacculi—and that there is a slight *cul-de-sac* in the rectum just as it turns down to the anus, even when empty.

2nd (Third portion).—The anus or anal passage is one inch in length, and has its lateral walls in contact save during defæcation; it is, in fact, an antero-posterior slit.

---

[1] Dr. Symington, *Journal of Anatomy and Physiology*, vol. xxiii. p. 100.

PLATE LXXII.

MUSCLES, VISCERA, &c.

A	Bladder.
B	Urachus.
C	Vas deferens.
D	Vesiculæ seminales.
E	Ureter.
F	Peritoneum.
G	Lateral true ligament of bladder.
H	Prostate.
K	Rectum, second portion.
L	First portion of the rectum.
M	Recto-vesical fascia.
O	Coccygeus muscle.
P	Levator ani.
R	Compressor urethræ.
S	Deep layer of the superficial perineal fascia. (Anterior layer of triangular ligament.)
T	Transversus perinei.
U	Accelerator urinæ.
V	Crus penis (corpus cavernosum).
X	Erector penis.
Y	Suspensory ligament of penis.
Z	Origin of adductor longus.
*	Origin of adductors and obturator from pubes.
†	Bulbous portion of corpus spongiosum.

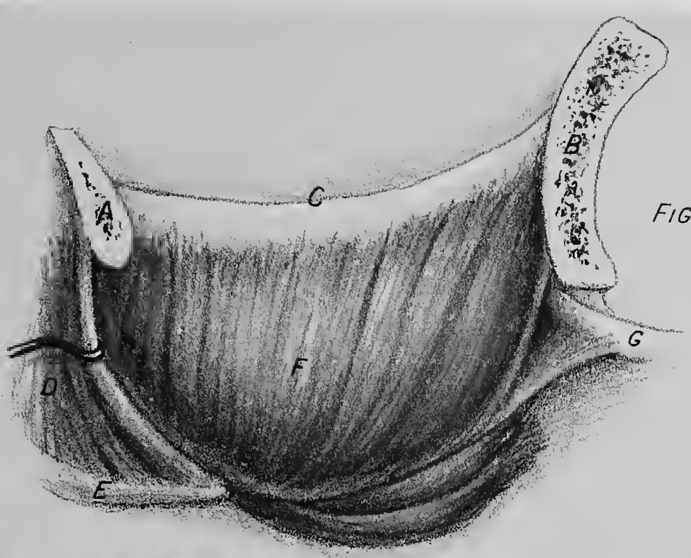
VESSELS

a	Aorta.
b	Common iliacs.
c	External iliac.
d	Internal iliac.
e	Sacra media.
f	Gluteal.
g	Sciatic.
h	Internal pudic.
i	Rectal.
k	Superior vesical.
l	Obliterated hypogastric.
m	Inferior vesical.
n	Inferior vena cava.
o	Common iliac veins.
p	Dorsal vein of penis.

FIG. 2.

A	Spine of ischium.
B	Body of pubes.
C	White line at the point of splitting of the pelvic fascia.
D	Coccygeus.
E	Coccyx.
F	Levator ani.
G	Obturator fascia, forming the posterior layer of the triangular ligament from which levator ani arises.

FIG II.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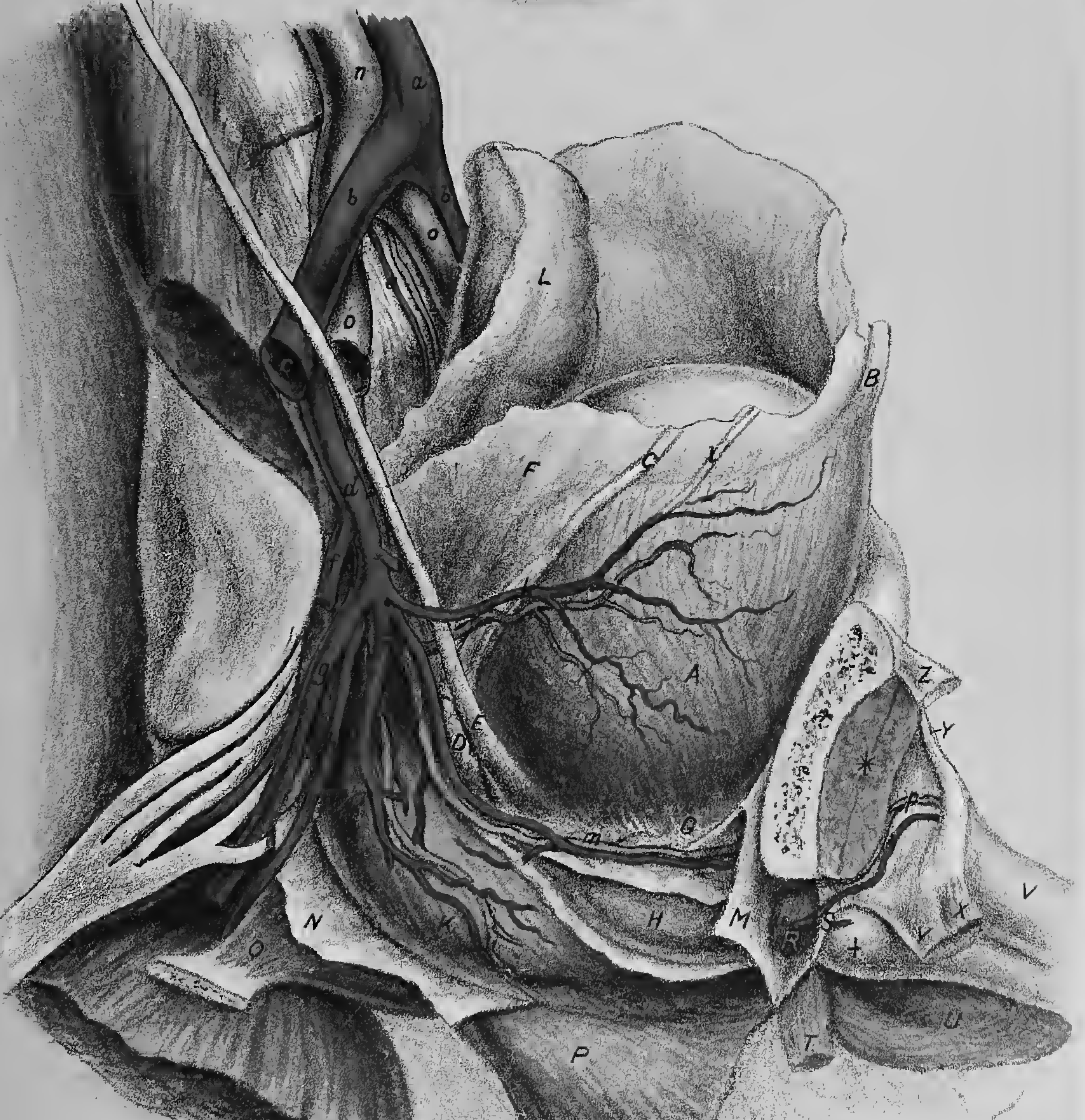
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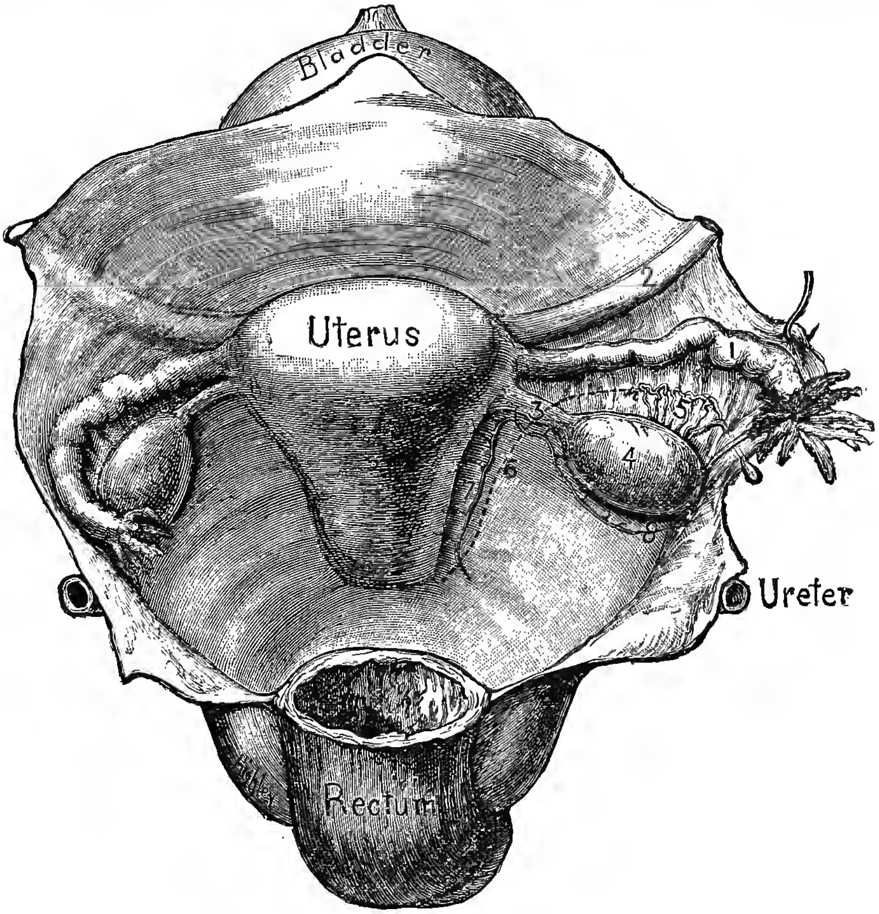
PLATE LXXIII.

SIDE VIEW OF THE FEMALE PELVIS.

This plate was drawn from a dissection of the female pelvis after removal of the innominate bone. The left os innominatum was disarticulated from the sacrum and sawn through the body in front just internal to the obturator foramen; the spine of the ischium having been first removed to preserve the coccygeus muscle. The levator ani and coccygeus muscles were then turned down, and the recto-vesical fascia partly dissected away to expose the rectum and vagina.

The accompanying diagram shows a posterior view of the uterus and broad ligaments; on the left side the ovary is represented in its natural position, while on the right the ligament is stretched out to show the paroöphoron (organ of Rosenmüller).



The following structures are contained between the layers of the broad ligament.

1. Fallopian tube.
2. Round ligament.
3. Ligament of ovary.
4. Ovary.
5. Paroöphoron.
6. Remains of Gaertner's duct.
7. Uterine artery and veins.
8. Ovarian artery and veins.
9. Lymphatics.
10. Sympathetic nerves.

PLATE LXXIII.

VISCERA, &c.

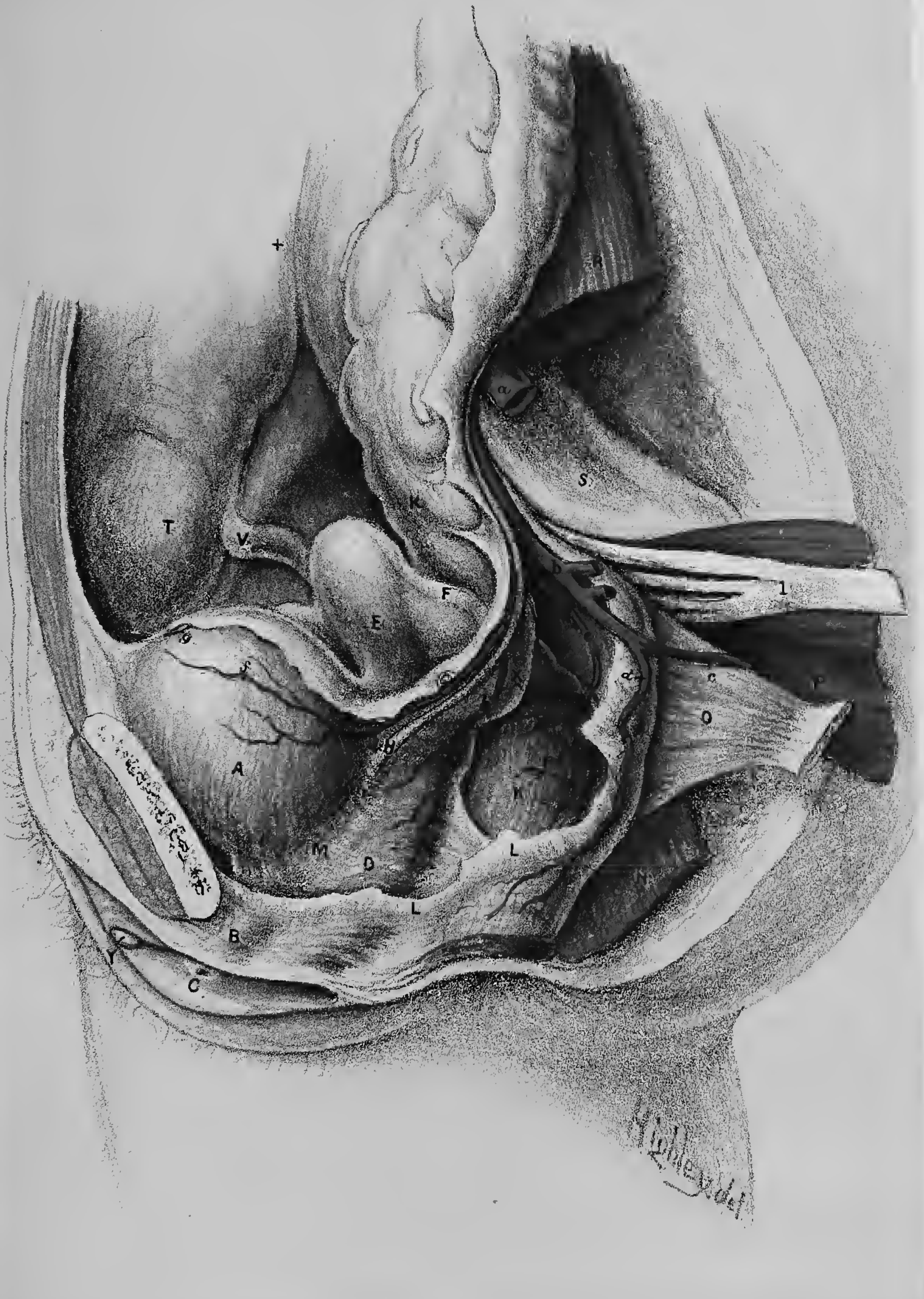
A Bladder.
B Urethra.
C Meatus urinarius.
D Vagina.
E Uterus.
F Fallopian tube forming upper edge of broad ligament.
G Round ligament.
H Ureter.
K Rectum, first portion.
K′ Second portion of rectum.
L Recto-vesical fascia.
M Lateral true ligament of bladder.
N Levator ani.
O Coccygeus.
P Pyriformis.
R Psoas.
S Auricular articular surface of sacrum.
T Cæcum.
V Vermiform appendix.
Y Clitoris.
X Peritoneum, forming Douglas's pouch between uterus and rectum.

VESSELS

a External iliac.
b Internal iliac.
c Internal pudic.
d A pelvic branch of internal pudic distributed to connective tissue and rectum.
e A branch of the superior hæmorrhoidal.
f Superior vesical.
g Obliterated hypogastric.
h Vaginal.

NERVES

1. Great sacro-sciatic.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PREFACE

In designing these plates the author has had in his mind the valuable assistance rendered to him in the first years of his curriculum by the magnificent plates of Professor Ellis, which, however useful they may be, are too large to be portable, and too expensive for the majority of students to obtain. In order to get over this difficulty, the plates, with the exception of five, instead of being life-size, are reduced by one-third, thus making a convenient and portable book; and it is hoped that the price will place these 'dissections' within the reach of all those who care for a graphic representation of anatomy. A picture or diagram of anatomy is far more useful in fixing the position of parts than a mere written description, and impresses them on the memory in such a manner, that they are easily recalled when engaged in surgical or medical work. The best illustration is the body itself, and it is here that the student must lay, *by careful dissection*, a good and sound foundation of his anatomical work. The author ventures to place these plates before the student as portraying the different structures in their normal positions, which he has to search for and display during his dissections. Thus they will serve as models and, further, will recall the work already done when revising his anatomy previous to an examination. And when, in after years, he has settled down into the staid and prosperous practitioner, the author hopes that, should any anatomical difficulty arise when there is no subject to refer to, these plates may serve to fill a gap by showing the relations of the different structures to one another, and thus recall work long since relegated to the background.

The dissections only aim at showing the ordinary details which any careful worker can dissect out for himself, and not unnecessary minutiæ. The various structures have been kept as closely as possible in their normal relations to each other. Finding it impossible in some of the dissections on the head and neck to crowd all the necessary detail into plates only two-thirds the natural size, full-size ones were substituted, and in order to give a good view of the anterior wall of the abdomen two double plates have been introduced.

The diagrams, upon which much time has been spent, are mostly from original work done by the author during his demonstratorship at the Middlesex Hospital Medical School; those in the First Part—the upper limb—being found too small, the rest have been drawn upon a larger scale and in a bolder method. And here I must express my gratitude to PROFESSOR CUNNINGHAM and DR. ROLLESTON for kindly giving me leave to reproduce diagrams in the 'abdomen' (Part IV.), which I hope will prove useful to a better understanding of its anatomy.

To MR. PERCY HIGHLEY great credit is due for the masterly way in which he has both drawn from nature and placed the plates on stone, and for rapidly grasping and representing artistically the intentions of the author. All the bony outlines of the cuts have been drawn from the skeleton, and in introducing the outline of the bones—a new feature—the relative positions of the bony landmarks to the cutaneous tissues have been shown.

To MR. DOBBIN and MR. A. G. NOBLE the author returns sincere thanks for their help in making some of the dissections, the former chiefly in Parts I. and II., and the latter especially in the last Part, where his name will be found conjoined with that of the author.

To MR. R. T. KENT, F.R.C.S., the Dean of the St. Mungo School of Medicine at Glasgow, the author is much indebted for kindly placing at his disposal the necessary material for the dissection of Plate 73.

The author returns his sincere thanks to DR. GUTHRIE, who kindly read through and criticised the letterpress of the last two Parts and made many valuable suggestions as to its revision.

Nor would this Preface be complete without a reference to the great kindness with which the author was treated by his old teacher and friend—the late MR. ARTHUR HENSMAN—both in the granting of material upon which to make the dissections, and in the kindly criticism of the First Part.

C. GORDON BRODIE.

80 HARLEY STREET, CAVENDISH SQUARE:
February 16, 1895.

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